Kin-Leong Pey (KL Pey)
Publications in major research areas

Shown in yellow are pioneering works of the respective category

Peer-reviewed journal publications

Physical characterization & analysis and in-situ study of dielectric breakdown/recovery and SET/RESET mechanism and structural evolution in ultrathin conventional gate oxide, high-k and 2D materials using TEM and AFM/STM

1. W.H. Lin, **K.L. Pey**, Z. Dong, S.Y. M. Chooi, M.S. Zhou, T.C. Ang, C.H. Ang, W.S. Lau and J.H. Ye, "*Effects of post-deposition anneal on the electrical properties of Si_3N_4 gate dielectric*", IEEE Electron Device Letters, vol. 23 (3), pp. 124-126, March 2002.

2. W.H. Lin, **K.L. Pey**, Z. Dong, V.S.K. Lim, S.Y.M. Chooi, M.S. Zhou, T.C. Ang and W.S. Lau, "*Impacts of buffer oxide in nitride/oxide stack gate dielectrics on the device performance and dielectric reliability*", Electrochemical and Solid-State Letters, vol. 5(4), F7-F9, 2002.

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8. **K.L. Pey**, C.H. Tung, L.J. Tang, W.H. Lin and M.K. Radhakrishnan, "*Size difference in dielectric-breakdown-induced epitaxy in narrow n- and p-metal oxide semiconductor field effect transistors*", Applied Physics Letters, Vol. 83 no. 14, pp. 2940-2942, 2003**.**

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10. D.S. Ang and **K.L. Pey**, "*Evidence for two distinct positive trapped charge components in NBTI stressed p-MOSFETs employing ultra-thin CVD silicon nitride gate dielectric*", IEEE Electron Device Letters, Vol. 25, No. 9, pp. 637-639, Sept 2004.

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12. T. Selvarajoo, R. Ranjan, **K.L. Pey**, L.J. Tang, C.H. Tung and W.H. Lin, "*Dielectric-breakdown-induced epitaxy: A universal breakdown defect in ultrathin gate dielectrics*", IEEE Trans. on Device and Materials Reliability, Vol. 5, no. 2, pp. 190-197, 2005.

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62. N. Raghavan, **K.L. Pey**, W.H. Liu and X. Li, "*New statistical model to decode the reliability and Weibull slope of high-k and interfacial layer in a dual layer dielectric stack*", 2010 IEEE International Reliability Physics Symposium (IRPS), pp.778-786, 2-6 May 2010, Anaheim, California, USA.

63. **Invited** **K.L. Pey**, X. Wu, W.H. Liu, X. Li, N. Raghavan, K. Shubhakar and M. Bosman, "*An overview of physical analysis of nanosize conductive path in ultra-thin SiON and high-k gate dielectrics in nanoelectronic devices*", 2010 17th IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), pp. 253-264, 5-9 July 2010, Singapore.

64. **Invited** **K.L. Pey**, "*New Insight of Resistive Switching in MIS Nano-scale Devices*", 24th Workshop and IEEE EDS Mini-colloquium (MQ) on NAnometer CMOS Technology (WIMNACT), 26 July 2010, Singapore, and the 25th WIMNACT, 28 July – 2 August 2010, Perth, Canberra, and Melbourne, Australia.

65. K. Shubhakar, **K.L. Pey**, S.S. Kushvaha, S.J. O'Shea, M. Bosman, M. Kouda, K. Kakushima and H. Iwai, "*Localized degradation and breakdown study of cerium-oxide high-k gate dielectric material using scanning tunneling microscopy*", 2010 17th IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), 5-9 July 2010, Singapore.

66. **Invited** **K.L. Pey**, N. Raghavan, X. Li, W.H. Liu, K. Shubhakar, X. Wu and M. Bosman, "*New insight into TDDB and post breakdown reliability of novel high-k gate dielectric stacks*", 2010 IEEE International Reliability Physics Symposium (IRPS), Anaheim, California, pp. 354-363, 2010, 2-6 May 2010, Anaheim, California, USA.

67. Z. Fang, H.Y. Yu, W.J. Liu, **K.L. Pey**, X. Li, L. Wu, Z.R. Wang, P.G.Q. Lo, B. Gao and J.F. Kang, "*Bias temperature instability of binary oxide-based ReRAM*", 2010 IEEE International Reliability Physics Symposium (IRPS), pp. 964-965, 2-6 May 2010, Anaheim, California, USA.

68. B.S. Ong, **K.L. Pey**, C.Y. Ong, C.S. Tan, C.L. Gan, H. Cai, D.A. Antoniadis and E.A. Fitzgerald, "*Effect of Fluorine Incorporation on $WSi_x/Al_2O_3/GaAs$ Gate Stack*", International Conference on Solid State Devices and Materials (SSDM), pp. 854-855, 22-24 September 2010, Tokyo, Japan.

69. Gennadi Bersuker, Dawei Heh, Chadwin D. Young, L. Morassi, Andrea Padovani, L. Larcher, K.S. Yew, Y. C. Ong, Diing Shenp Ang, **Kin Leong Pey**, Will Taylor, "*Mechanism of high-k dielectric-induced breakdown of the interfacial SiO_2 layer*", 2010 IEEE International Reliability Physics Symposium (IRPS), pp. 373-378, 2-6 May 2010, Anaheim, California, USA.

70. L. Wu, H. Y. Yu, X. Li, **K. L. Pey**, K. Y. Hsu, H. J. Tao, Y. S. Chiu, C. T. Lin, J. H. Xu and H. J. Wan, "*Investigation of ALD or PVD (Ti-rich vs. N-rich) TiN metal gate thermal stability on HfO_2 high-K*", 2010 International Symposium on VLSI Technology, Systems, and Applications, 26-28 April 2010, Hsinchu, Taiwan.

71. **Invited** **K.L. Pey**, N. Raghavan, X. Wu, W.H. Liu, X. Li, M. Bosman, K. Shubhakar, Z.Z. Lwin, Y.N. Chen, H. Qin and T. Kauerauf, "*Physical analysis of breakdown in high-k / metal gate stacks using TEM/EELS and STM for reliability enhancement*", 17th International Symposium on Insulating Films on Semiconductors (INFOS), 21-24 June 2011, Grenoble, France.

72. A.L. Danilyuk, D.B. Migas, M.A. Danilyuk, V.E. Borisenko, X. Wu, N. Raghavan and **K.L. Pey**, "*Thermal formation of switching resistivity nanowires in hafnium dioxide*", Proceedings of the International Conference on Nanomeeting, pp. 39-42, 24-27 May 2011, Minsk, Belarus.

73. W.H. Liu, **K.L. Pey**, N. Raghavan, X. Wu and M. Bosman, "*Random telegraph noise reduction in metal gate high-k stacks by bipolar switching and the performance boosting technique*", 2011 IEEE International Reliability Physics Symposium (IRPS), pp.182-189, 10 - 14 April 2011, Monterey, California, USA.

74. K. Shubhakar, **K.L. Pey**, S.S. Kushvaha, S.J. O'Shea, M. Bosman, N. Raghavan, M. Kouda, K. Kakushima, Z.R. Wang, H.Y. Yu and H. Iwai, "*Nanoscale electrical and physical study of polycrystalline high-k gate dielectric stacks and proposed reliability enhancement techniques*", 2011 IEEE International Reliability Physics Symposium (IRPS), Monterey, CA, pp.786-791, 10 - 14 April 2011, Monterey, California, USA.

75. Y.N. Chen, **K.L. Pey**, K.E.J. Goh. Z.Z. Lwin, P.K. Singh and S. Mahapatra, "*Study of the charge leakage of dual layer Pt metal nanocrystal-based high-k/SiO2 flash memory cell - a relaxation current point of view*", IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), 4-7 July 2011, Incheon, South Korea.

76. X.A. Tran, B. Gao, J.F. Kang, X. Wu, L. Wu, Z. Fang, Z.R. Wang, Z. Fang, **K.L. Pey**, Y.C. Yeo, A. Y. Du, B.Y. Nguyen, M.F. Li and H.Y. Yu, "*High performance unipolar $AlO_y/HfO_x/Ni$ based RRAM compatible with Si diodes for 3D application*", 2011 Symposium on VLSI Technology, 13-16 June 2011, Kyoto, Japan.

77. X.A. Tran, B. Gao, J.F. Kang, X. Wu, L. Wu, Z. Fang, Z.R. Wang, **K.L. Pey**, Y.C. Yeo, A. Y. Du, M. Liu, B.Y. Nguyen, M.F. Li and H.Y. Yu, "*Self-rectifying and forming-free unipolar HfOx based-high performance RRAM built by fab-available materials*", 2011 IEEE International Electron Devices Meeting (IEDM), 5-7 December 2011, Washington, DC, USA.

78. **Invited** **K.L. Pey**, "*Design for reliability of gate stack systems for nanoscale transistor*", 6th International Conference on Materials for Advanced Technologies (ICMAT) (Poster), 26 June - 1 July 2011, Singapore.

79. K. Shubhakar, **K.L. Pey**, M. Bosman, R. Thamankar, S.S. Kushvaha, Y. C. Loke, Z. R. Wang, X. Wu, N. Raghavan and S.J. O'Shea, "*Nanoscale physical analysis of localized breakdown events in HfO_2/SiO_X dielectric stack: A correlation study of STM induced BD with C-AFM and TEM*", IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), 2 – 6 July 2012, Singapore.

80. K. Shubhakar, **K.L. Pey**, N. Raghavan, S.S. Kushvaha, R. Thamankar, M. Bosman, Z.R. Wang, S. J. O'Shea, "*Nanoscale analysis of trap induced degradation and breakdown at grain boundary sites of polycrystalline*

HfO_2 dielectric film", 2012 IEEE International Reliability Physics Symposium (IRPS), 15-19 April 2012, Anaheim, California, USA.

81. **K.L. Pey**, N. Raghavan, X. Wu, W.H. Liu and M. Bosman, "*Statistical and thermodynamic perspective to reliability of filamentary mode switching in nickel electrode RRAM*", 3rd International Workshop on Simulation and Modelling of Memory devices (IWSMM), 4-5 October 2012, Micron, Via C. Olivetti 2, Agrate Brianza, Milan, Italy.

82. **Invited K.L Pey**, N. Raghavan, X. Wu, W. Liu and M. Bosman, "*Dielectric breakdown – Recovery in logic and resistive switching in memory – Bridging the gap between the two phenomena*", 2012 IEEE 11th International Conference on Solid-State and Integrated Circuit Technology (ICSICT), 29 October – 1 November 2012, Xi'an, China.

83. N. Raghavan, **K.L. Pey**, K. Shubhakar, X. Wu, W.H. Liu and M. Bosman, "*Role of grain boundary percolative defects and localized trap generation on the reliability statistics of high-k gate dielectric stacks*", 2012 IEEE International Reliability Physics Symposium (IRPS), p. 6A.1.1-6A.1.11, 15-19 April 2012, Anaheim, California, USA.

84. N. Raghavan, **K.L. Pey**, K Shubhakar and Daniel D. Frey, "*Monte Carlo evidence for need of improved percolation model design to describe non-Weibullian physics of failure in high permittivity dielectrics*", 2013 IEEE Annual Reliability and Maintainability Symposium (RAMS 2013), 28 – 31 January 2013, Orlando, Florida, USA.

85. N. Raghavan, **K.L. Pey** and Daniel D. Frey, "*Noise-based prognostic design for real-time degradation analysis and early prediction of ultra-thin dielectric breakdown*", Reliability and Maintainability Symposium Annual (RAMS 2013), 28 – 31 January 2013, Orlando, Florida, USA.

86. **Invited K.L. Pey**, N. Raghavan, W. H. Liu, X. Wu, K. Shubhakar and M. Bosman, "*Real-Time analysis of ultra-thin gate dielectric breakdown and recovery – A reality*", 20th IEEE Physical and Failure Analysis of Integrated Circuits (IPFA), 15 – 19 July 2013, Suzhou, China.

87. **Invited Tutorial K.L. Pey**, "*Dielectric breakdown in High-k/Metal Stacks: Nanoscopic techniques for studying breakdown induced morphological changes and defects*", 20th IEEE Physical and Failure Analysis of Integrated Circuits (IPFA), 15 – 19 July 2013, Suzhou, China.

88. **Invited Tutorial K.L. Pey**, "*Techniques and approaches for morphological investigation on dielectric breakdown in High-k/Metal stacks*", 24th European Symposium Reliability of Electron devices, Failure physics and analysis 30 September - 4 October 2013, Arcachon, France.

89. **Invited K.L. Pey**, "*Employing Nickel/Oxide/Si for resistive switching based for non-volatile digital storage applications - Fundamental physical evidence and technology implications*", 7th International Conference on Materials for Advanced Technologies (ICMAT), 30 June - 05 July 2013, Singapore.

90. **Invited K.L. Pey**, "*Design for reliability for advanced nanoelectronics gate stack*", 7th International Conference on Materials for Advanced Technologies (ICMAT), 30 June - 05 July 2013, Singapore.

91. N. Raghavan, A. Padovani, X. Wu, K. Shubhakar, M. Bosman, L. Larcher and **K.L. Pey**, "*The "buffering" role of high-k in post breakdown degradation immunity of advanced dual layer dielectric gate stacks*", 2013 IEEE International Reliability Physics Symposium (IRPS), 14-18 April 2013, Monterey, California, USA.

92. **Invited K.L. Pey,** K. Shubhakar, N. Raghavan, X. Wu, and M. Bosman, "*Impact of local variations in high-k dielectric on breakdown and recovery characteristics of advanced gate stacks*", IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC 2013), 3-5 June 2013, Hong Kong, China.

93. **Invited** **K.L. Pey**, "*Are breakdown and recovery in ultrathin gate dielectrics similar to resistive switching?*", IEEE EDS Mini-Colloquium on Advanced Technology of Micro & Nanoelectronics, 22 July 2013, Peking University, Beijing, China.

94. N. Raghavan, **K.L. Pey**, D.D. Frey and M. Bosman, "*Stochastic failure model for endurance degradation in vacancy modulated HfO_x RRAM using the percolation cell framework*", 2014 IEEE International Reliability Physics Symposium (IRPS), MY.9.1-MY.9.7, 1-5 May 2014, Hawaii, USA.

95. N. Raghavan, **K.L. Pey**, D.D. Frey and M. Bosman, "*Impact of ionic drift and vacancy defect passivation on TDDB statistics and lifetime enhancement of metal gate high-k stacks*", 2014 IEEE International Reliability Physics Symposium (IRPS), 5B.4.1-5B.4.7, 1-5 May 2014, Hawaii, USA.

96. **Invited** **K.L. Pey**, N. Raghavan, X. Wu, M. Bosman, Xi-Xiang Zhang and K. Li, "*Spatial correlation of conductive filaments for multiple switching cycles in CBRAM*", 2014 IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC), 18-20 June 2014, Chengdu, China.

97. **Invited** **K.L. Pey**, N. Raghavan, X. Wu, M. Bosman, "*Filamentary switching with semiconducting bottom electrode – physical insight and advantages*", IEEE International Electron Devices and Materials Symposium (IEDMS 2014), 20-21 November 2014, Hualien, Taiwan.

98. **Invited** **K.L. Pey**, "*Physical analysis of switching filament in nanodevices*", The 3rd International Symposium on Next-Generation Electronics (ISNE 2014), 7-10 May 2014, Taoyuan, Taiwan.

99. **Invited** N. Raghavan, W.H. Liu, R. Thamankar, M. Bosman and **K.L. Pey**, "*Understanding defect kinetics in ultra-thin dielectric logic and memory devices using random telegraph noise analysis*", 22nd International IEEE Symposium Physical and Failure Analysis of Integrated Circuits (IPFA), pp. 149-153, 29 June – 2 July 2015, Hsinchu, Taiwan.

100. A. Ranjan, K. Shubhakar, N. Raghavan, R. Thamankar, M. Bosman, S.J. O'Shea, and **K.L. Pey**. "*Localized random telegraphic noise study in HfO_2 dielectric stacks using scanning tunneling microscopy — Analysis of process and stress-induced traps*", 22nd International IEEE Symposium Physical and Failure Analysis of Integrated Circuits (IPFA), pp. 458-462, 29 June – 2 July 2015, Hsinchu, Taiwan.

101. N. Raghavan, M. Bosman, and **K.L. Pey**, "*Spectroscopy of SILC trap locations and spatial correlation study of percolation path in the high-k and interfacial layer*", 2015 IEEE International Reliability Physics Symposium (IRPS), pp. 5A-2, 9-23 April 2014, Monterey, California, USA.

102. N. Raghavan, D.D. Frey, M. Bosman, and **K.L. Pey**, "*Monte Carlo model of reset stochastics and failure rate estimation of read disturb mechanism in HfO_x RRAM*", 2015 IEEE International Reliability Physics Symposium (IRPS), pp. 5B-2, 9-23 April 2014, Monterey, California, USA.

103. S. Mei, M. Bosman, X. Wu, R. Nagarajan and **K.L. Pey**, "*$NiSi_x$ substrate defect size dependence on compliance current in Ni/dielectric/Si RRAM devices*", International Conference on Materials for Advanced Technologies (ICMAT), 28 June – 3 July 2015, Singapore.

104. N. Raghavan, D.D. Frey, M. Bosman and **K.L. Pey**, "*Statistics of retention failure in the low resistance state for hafnium oxide RRAM using a kinetic Monte Carlo approach*", 26th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 5-9 October 2015, Toulouse, France.

105. N. Raghavan, D.D. Frey and **K.L. Pey**, "*Probabilistic insight to possibility of new metal filament nucleation during repeated cycling of conducting bridge memory*", 26th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 5-9 October 2015, Toulouse, France.

106. K. Shubhakar, M. Bosman, O.A. Neucheva, Y.C. Loke, N. Raghavan, R. Thamankar, A. Ranjan, S.J. OShea and **K.L. Pey**, "*An SEM/STM based nanoprobing and TEM study of breakdown locations in HfO_2 dielectric stacks for*

failure analysis", 26th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 5-9 October 2015, Toulouse, France.

107. **Invited Tutorial** **K.L. Pey**, "*Nanoscopic techniques for studying dielectric breakdown and switching induced morphological changes and defects*", IEEE IEEE International Integrated Reliability Workshop (IIRW), 11-15 October 2015, Fallen Leaf Lake, California, USA.

108. **Invited** **K.L. Pey**, S. Mei, N. Raghavan and M. Bosman, "*Fundamental mechanisms responsible for resistive switching in Ni/HfO_2/Si stack*", IEEE TENCON 2015, 1- 4 November 2015, Macau SAR, China.

109. L. Q. Luo, D. X. Wang, F. Zhang, J.B. Tan, Y.T. Chow, Y.J. Kong, J.Y. Huang, Y.M. Liu, M. Oh, H. Balan, P. Khoo, C.Q. Chen, B.H. Liu, D. Shum, K. Shubhakar and **K.L. Pey**, "*SRAM V_{min} yield challenge in 40nm embedded NVM process*", 22nd IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), pp 115-117, 29 June – 2 July 2015, Hsinchu, Taiwan.

110. **Invited** **K.L. Pey**, S. Mei, X. Wu, N. Raghavan, M. Bosman, X. Zhang, K. Li, "*Correlation of nanofilamention formation in oxide-based dielectrics with resistive switching using TEM*", BIT's 4th Annual World Congress of Advanced Materials-2015 (WCAM-2015), 27-29 May 2015, Chongqing, China.

111. **Invited** **K.L. Pey**, A. Ranjan, R. Thamankar, K. Shubhakar, N. Raghavan and S.J. O'Shea, "*Observation of resistive switching by physical analysis techniques*", 5th International Symposium on Next-Generation Electronics (ISNE), 4-6 May 2016, Hsinchu, Taiwan.

112. **Invited** **K.L. Pey**, "*An overview of physical analysis of using in-situ TEM and STM/AFM-based techniques for switching study in RRAM*", 6th Annual World Congress of Nano Science and Technology-2016 (Nano S&T-2016), 26-28 October 2016, Singapore.

113. **Invited** **K.L. Pey**, M. Bosman, N. Raghavan, S. Mei, X. Wu, X. Zhang and K. Li, "*Real time observation of switching mechanisms in MIS devices by TEM/EELS*", 2016 Energy Material Nanotechnology (EMN), 20-25 April 2016, Beijing, China.

114. **Invited** **K.L. Pey**, A. Ranjan, N. Raghavan, K. Shubhakar and S.J. O'Shea, "*Analysis of ultralow power resistive switching events in HfO_2 RRAM using conductive atomic force microscopy*", International Electron Devices and Materials Symposium (IEDMS), 24-25 November 2016, Taipei, Taiwan.

115. **Invited Keynote** **K.L. Pey**, "*Design for reliability for advanced nanoelectronic gate stack*", IEEE 23rd The International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), 18-21 July 2016, Singapore.

116. **Invited** **K.L. Pey**, R. Thamankar, S. Mei, M. Bosman, N. Raghavan and K. Shubhakar, "*Understanding the switching mechanism in RRAM using in-situ TEM*", IEEE Silicon Nanoelectronics Workshop (SNW), 36-37, 12-13 Jun 2016, Hawaii, USA.

117. S. Mei, N. Raghavan, M. Bosman, D. Linten, G. Groeseneken, N. Horiguchi and **K.L. Pey**, "*New understanding of dielectric breakdown in advanced FinFET devices – Physical, electrical, statistical and multi-physics study*", IEEE International Electron Device Meeting (IEDM), pp. 1-4, 3-7 December 2016, San Francisco, California, USA.

118. **Invited** **K.L. Pey**, A. Ranjan, R. Thamankar, K. Shubhakar, N. Raghavan and S.J. O'Shea, "*Random telegraph noise study in HfO_2 dielectric stacks using STM/CAFM: Analysis of local defects, degradation and breakdown*", IEEE International Nanoelectronics Conference (INEC), 9-11 May 2016, Chengdu, China.

119. **Invited** **K.L. Pey**, "*Understanding the switching mechanism in RRAM using in-situ TEM*", Zeiss Symposium on Semiconductor Technology Imaging & Analysis: Challenges and Opportunities, 22 July 2016, Advanced Remanufacturing and Technology Centre (ARTC), Singapore.

120. A. Ranjan, N. Raghavan, K. Shubhakar, R. Thamankar, J. Molina, S.J. O'Shea, M. Bosman and **K.L. Pey**, "*CAFM based spectroscopy of stress-induced defects in HfO_2 with experimental evidence of the clustering model and metastable vacancy defect state*", 2016 IEEE International Reliability Physics Symposium (IRPS), pp. 7A-4-1, 17-21 April 2016, Pasadena, California, USA.

121. S. Mei, N. Raghavan, K. Shubhakar, M. Bosman and **K.L. Pey**, "*Multiphysics based 3D percolation framework model for multi-stage degradation and breakdown in high-k – interfacial layer stacks*", 2016 IEEE International Reliability Physics Symposium (IRPS), pp. 7A-2, 17-21 April 2016, Pasadena, California, USA.

122. R. Ranjan, N. Raghavan, J. Molina, S.J. O'Shea, K. Shubhakar and **K.L. Pey**, "*Analysis of quantum conductance, read disturb and switching statistics in HfO_2 RRAM using conductive AFM*", 27th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 19-22 September 2016, Halle, Germany.

123. K. Shubhakar, S. Mei, M. Bosman, N. Raghavan, A. Ranjan, S.J. O'Shea and **K. L. Pey**, "*Conductive filament formation at grain boundary locations in polycrystalline HfO_2 based MIM stacks- Computational and physical insight*", 27th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 19-22 September 2016, Halle, Germany.

124. L.Q. Luo, Z.Q. Teo, Y.J. Kong, F.X. Deng, J.Q. Liu, F. Zhang, X.S. Cai, K.M. Tan, K.Y. Lim, P. Khoo, S.M. Jung, S.Y. Siah, D. Shum, C.M. Wang, J.C. Xing, G.Y. Liu, Y. Diao, G.M. Lin, L. Tee, S.M. Lemke, P. Ghazavi, X. Liu, N. Do, **K.L. Pey**, K. Shubhakar, "*Functionality demonstration of a high-density 2.5V self-aligned split-gate NVM cell embedded into 40nm CMOS logic process for automotive microcontrollers*", 8th International Memory Workshop (IMW), pp 1-4, 15-18 May 2016, Paris, France.

125. N. Raghavan and **K.L. Pey**, "*Percolation framework and Monte Carlo techniques for improved probabilistic design of variability in products and systems*", 6th International Conference on Research into Design (ICoRD'17), 9-11 January 2017, Guwahati, India.

126. A. Ranjan, N. Raghavan, B. Liu, S.J. O'Shea, K. Shubhakar, C.S. Lai and **K.L. Pey**, "*Nanoscale investigations of soft breakdown events in few layered fluorinated graphene*", 2017 IEEE International Reliability Physics Symposium (IRPS), 2-6 April 2017, Monterey, California, USA.

127. S. Mei, N. Raghavan, M. Bosman and **K.L. Pey**, "*Statistical basis and physical evidence for clustering model in FinFET degradation*", 2017 IEEE International Reliability Physics Symposium (IRPS), 2-6 April 2017, Monterey, California, USA.

128. J.H. Lim, N. Raghavan, S. Mei, K. H. Lee, S.M. Noh, J.H. Kwon, E. Quek and **K.L. Pey**, "*Asymmetric dielectric breakdown behaviour in MgO based magnetic tunnel junctions*", Insulating Films on Semiconductors (INFOS), 2017, 27-30 June 2017, Potsdam, Germany.

129. **Invited** **K.L. Pey**, A. Ranjan, S. Mei, N. Raghavan, K. Shubhakar, M. Bosman and S.J.O' Shea, "*Recent key developments in nanoscale reliability and failure analysis techniques for advanced nanoelectronics devices*", Semiconductor Technology for Ultra-Large Scale Integrated Circuits and Thin Film Transistors VI (ULSIC vs TFT 6), 21-25 May 2017, Schloss Hernstein, Austria.

130. **Invited Keynote** **K. L. Pey**, S. Mei, A. Ranjan, N. Raghavan, K. Shubhakar, R Thamankar, M. Bosman, and S.J. O'Shea, "*Advanced physical characterization techniques in FinFET and RRAM study*", 18th International Union Materials Research Societies, International Conference in Asia (IUMRS-ICA 2017), 5-9 November 2017, Taipei, Taiwan.

131. X. Feng, N. Raghavan, S. Mei, L. Du, **K.L. Pey** and H. Wong, "*Role of metal nanocrystals on the breakdown statistics of flash memory high-k stacks*", 20th Insulating Films on Semiconductors (INFOS) conference, 26–30 June 2017, Potsdam, Germany.

132. Y. Shi, C. Pan, V. Chen, N. Raghavan, **K.L. Pey**, F.M. Puglisi, E. Pop, H.S.P. Wong and M. Lanza, "*Coexistence of volatile and non-volatile resistive switching in 2D h-BN based electronic synapses*", 2017 IEEE International Electron Devices Meeting (IEDM), 2-6 December 2017, San Francisco, California, USA.

133. **Invited** **K.L. Pey**, A. Ranjan, K. Shubhakar, and N. Raghavan, "*Nanoscale analysis of defects, degradation, and breakdown in HfO_2 dielectrics*", 13th IEEE International Conference on Electron Devices and Solid-State Circuits, 18-20 June 2017, Hsinchu, Taiwan.

134. **Invited** **K.L. Pey**, A. Ranjan, S. Mei, N. Raghavan, K. Shubhakar, M. Bosman and S.J. O'Shea, "*Latest Development of Study of Switching Mechanisms in RRAM Using STM/AFM and In-Situ TEM Analysis*", China RRAM International Workshop, 12-13 June 2017, Suzhou, China.

135. Danny Shum, Lai Q. Luo, Y.J. Kong, F.X. Deng, X. Qu, Z.Q. Teo, J. Q. Liu, F. Zhang, X.S. Cai, K.M. Tan, K.Y. Lim, P. Khoo, P.Y. Yeo, B.Y. Nguyen, S.M. Jung, S.Y. Siah, **K.L. Pey**, K. Shubhakar, C.M. Wang, J.C. Xing, G.Y. Liu, Y. Diao, G.M. Lin, F. Luo, L. Tee, V. Markov, S.M. Lemke, P. Ghazavi, Nhan Do, Vipin Tiwari, Xian Liu, "*40nm Embedded Self-Aligned Split-Gate Flash Technology for High-Density Automotive Microcontrollers*", 2017 IEEE International Memory Workshop (IMW) 14-17 May 2017, Monterey, California, USA.

136. J.H. Lim, N. Raghavan, S. Mei, V. Naik, J.H. Kwon, K.H. Lee and **K.L. Pey**, "*Area and pulse width dependence of bipolar TDDB in MgO STTRAM*", 2018 IEEE International Reliability Physics Symposium (IRPS), 11-15 March 2018, Burlingame, California, USA.

137. **Invited Keynote** **K.L. Pey**, A. Ranjan, S. Mei, K. Shubhakar, N. Raghavan, and S.J. O'Shea, "*New opportunities and potential of advanced physical analysis techniques to study nanoscale semiconductor devices*", 14th IEEE International Conference on Electron Devices and Solid-State Circuits, 6-8 June 2018, Shenzhen, China.

138. **Invited Keynote** **K.L. Pey**, "*Emerging opportunities of advanced physical analysis techniques for nano-scale semiconductor devices*", 1st International Congress on Micro and Nanoelectronics (nanoMX2018), 25 – 26 October 2018, Tonantzintla, Puebla, Mexico.

139. **Selected as one of the top papers for conference highlights** A. Ranjan, N. Raghavan, S.J.O' Shea, S. Mei, M. Bosman, K. Shubhakar and **K.L. Pey**, "*Mechanism of soft and hard breakdown in hexagonal boron nitride 2D dielectrics*", 2018 IEEE International Reliability Physics Symposium (IRPS), 11-15 March 2018, Burlingame, California, USA.

140. Xuan Feng, Nagarajan Raghavan, Sen Mei, **K.L. Pey** and Hei Wong, "*Statistical nature of hard breakdown recovery in high-k dielectric stacks studied using ramp voltage stress*", 29th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 1-5 October 2018, Aalborg, Denmark.

141. J. H. Lim, N. Raghavan, V. B. Naik, J.H. Kwon, K.H. Lee and **K.L. Pey**, "*Stress dependent Weibull slope and defect clustering role in breakdown statistics of MgO dielectrics in STTRAM devices*", 29th European Symposium on Reliability of Electron Devices, Failure Physics and Analysis, 1-5 October 2018, Aalborg, Denmark.

142. J.H. Lim, N. Raghavan, A. Padovani, J.H. Kwon, K. Yamane, H. Yang, V.B. Naik, L. Larcher, K.H. Lee and **K.L. Pey**, "*Investigating the statistical-physical nature of MgO dielectric breakdown in STT-MRAM at different operating conditions*", 2018 IEEE International Electron Devices Meeting (IEDM), 1-5 December 2018, San Francisco, California, USA.

143. Xing Wu, Chen Luo, Peng Hao, Tao Sun, Runsheng Wang, Chaolun Wang, Zhigao Hu, Yawei Li, Jian Zhang, Gennadi Bersuker, Litao Sun and **K.L. Pey**, "*Probing and manipulating the interfacial defects of InGaAs dual-layer metal oxides at the atomic scale*", 2018 China Semiconductor Technology International Conference (CSTIC), 11-12 March 2018, Shanghai, China.

144. **Invited** **K.L. Pey**, "*Physical Analysis to study ultrathin oxide breakdown (SET) and recovery (RESET)*", 2018 IEEE International Integrated Reliability Workshop (IIRW 2018), 7-11 October 2018, Fallen Leaf Lake, CA, USA.

145. **Awarded Best IRPS Paper** F. Aguirre, A. Padovani, A. Ranjan, N. Raghavan, N. Vega, N. Müller, S, Pazos, M. Debray, J. Molina, **K.L. Pey** and F. Palumbo, "*Spatio-Temporal Defect Generation Process in Irradiated HfO_2 MOS Stacks: Correlated versus Uncorrelated Mechanisms*", 2019 IEEE International Reliability Physics Symposium (IRPS), 31 March – 4 April 2019, Monterey, California, USA.

146. **Invited K.L. Pey**, J.H. Lim, N. Raghavan, S. Mei, J.H. Kwon, V.B. Naik, K. Yamane, H. Yang and K. Lee, "*New insights into dielectric breakdown of MgO in STT-MRAM devices*", 3rd IEEE Electron Devices Technology and Manufacturing (EDTM) Conference 2019, 12-15 March 2019, Singapore.

147. **Invited K.L. Pey**, "*Physical analysis of breakdown in ultrathin dielectrics for advanced Si technology*", 2019 IEEE International Reliability Physics Symposium (IRPS), 31 March – 4 April 2019, Monterey, California, USA.

148. **Invited K.L. Pey**, "*Physical analysis to study resistive switching phenomena in ultrathin dielectric systems*", 2019 IEEE International Integrated Reliability Workshop (IIRW 2019), 13-17 October 2019, South Lake Tahoe, California, USA.

149. J.H. Lim, N. Raghavan, V.B. Naik, J.H. Kwon, K. Yamane, H. Yang, K.H. Lee and **K.L. Pey**, "*Correct extrapolation model for TDDB of STT-MRAM MgO magnetic tunnel junctions*", 2019 IEEE International Reliability Physics Symposium (IRPS), 31 March – 4 April 2019, Monterey, California, USA.

150. **K.L. Pey**, A. Ranjan, N. Raghavan, S. Kalya and S.J. O'Shea, "*Dielectric breakdown in 2D layered hexagonal boron nitride—The knowns and the unknowns*", IEEE 3rd Electron Devices Technology and Manufacturing (EDTM) Conference 2019, 12-15 March 2019, Singapore.

151. **Invited K.L. Pey**, A. Ranjan, N. Raghavan, and S.J. O'Shea, "*New Physics of Breakdown in 2D Hexagonal Boron Nitride Dielectrics and Its Potential Applications*", 8th International Symposium on Next Generation Electronics (ISNE), 9-10 Oct. 2019, Zhengzhou, China.

152. A. Ranjan, S.J. O'Shea, M. Bosman, J. Molina, N. Raghavan, **K.L. Pey**, "*Correlation of Dielectric Breakdown and Nanoscale Adhesion in Silicon Dioxide Thin Films*", 2020 IEEE International Reliability Physics Symposium (IRPS), 28 April - 30 May 2020, Dallas, TX, USA (virtual due to COVID-19).

153. **Invited Plenary K.L. Pey**, A. Ranjan, N. Raghavan and Sean O'Shea, "*Wear-out Physics of 2D Hexagonal Boron Nitride*", 2020 Collaborative Conference on Materials Research (CCMR), 8-12 June 2020, Incheon/Seoul, South Korea (cancelled last-minute due to COVOD-19).

154. L. Luo, S. Kalya, S. Mei, N. Raghavan, F. Zhang, D. Shum and **K.L. Pey**, "*Reliability and Breakdown Study of Erase Gate Oxide in Split-Gate Non-Volatile Memory Device*", 2020 IEEE International Reliability Physics Symposium (IRPS), 28 April - 30 May 2020, Dallas, TX, USA (virtual due to COVID-19).

155. J.H. Lim, N. Raghavan, J.H. Kwon, T.Y. Lee, R. Chao, N.L. Chung, K. Yamane, N. Thiyagarajah, V.B. Naik and **K.L. Pey**, "*Origins and signatures of tail bit failures in ultrathin MgO based STT-MRAM*", 2020 IEEE International Reliability Physics Symposium (IRPS), 28 April - 30 May 2020, Dallas, TX, USA (virtual due to COVID-19).

156. **Invited Keynote K.L. Pey**, "*New Opportunities of Advanced Physical & Electrical Analysis Techniques for Characterization of Nanoelectronic Devices & Systems*", VLSI, Signal Processing, Power Electronics, IoT, Communication and Embedded Systems (VSPICE-2020), 22 - 23 December 2020, Nitte, Udupi District, India (virtual due to COVID-19).

157. **Invited K.L. Pey**, A. Ranjan, K. Shubhakar, V.K. Ravikumar, J.H. Lim, N. Raghavan and S.J. O'Shea, "*Characterization of Nanoelectronic Devices & Circuits by Advanced Physical, Electrical and Optical Analysis Techniques*", International Symposium on Next-Generation Electronics (ISNE), 10-11 July 2021, Changsha, China.

158. **Invited Keynote K.L. Pey**, "*Characterization of Nanoelectronic Devices & Circuits by Advanced Physical and Electrical Analysis Techniques*", International Congress on Micro and Nanoelectronics (nanoMX2021), 3 October 2021, Tonantzintla, Puebla, Mexico.

159. **Invited K.L. Pey**, A. Ranjan, A. Maruvada, K. Shubhakar, N. Raghavan and S.J. O'Shea, "*New Insights on Physics of Degradation and Breakdown in 2D Dielectric Materials*", 29th International Conference on Amorphous and Nano-crystalline Semiconductors (ICANS 29), 23 - 26 August 2022, Nanjing, China.

160. Tiang Teck Tan, Yu-Yun Wang, Joel Tan, Tian-Li Wu, Nagarajan Raghavan, **Kin Leong Pey**, "*A New Methodology to Precisely Induce Wake-Up for Reliability Assessment of Ferroelectric Devices*", 2023 IEEE International Reliability Physics Symposium (IRPS), 26-30 March 2023, Monterey, USA.

161. J Tan, JH Lim, Jae Hyun Kwon, Vinayak Bharat Naik, Nagarajan Raghavan, **Kin Leong Pey**, "*Backhopping-based STT-MRAM Poisson Spiking Neuron for Neuromorphic Computation*", 2023 IEEE International Reliability Physics Symposium (IRPS), 26-30 March 2023, Monterey, USA.

162. Anirudh Maruvada, Sean J O'Shea, Jie Deng, Shubhakar Kalya, Nagarajan Raghavan, **Kin Leong Pey**, "*Electrical Stress Induced Breakdown and Post Breakdown Physical Analysis of Mica Based Nano Capacitors",* 2023 IEEE Nanotechnology Materials and Devices Conference (NMDC), Paestum, Italy, 22-25 October 2023.

163. Tang Teck Tan, Tian-Li Wu, Jean Coignus, Simon Martin, Laurent Grenouillet, Andrea Padovani, Francesco Maria Puglisi, Paolo La Torraca, Kalya Shubhakar, Nagarajan Raghavan, **Kin Leong Pey**, "*Effects of the Interfacial Layer on the Leakage Current and Hysteresis Behaviour of Ferroelectric Devices*", 2024 IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), 15-18 July 2024, Singapore.

164. Tiang Teck Tan, Tian-Li Wu, Hsien-Yang Liu, Chen-Yu Yu, Laurent Grenouillet, Paolo La Torraca, Andrea Padovani, Francesco Maria Puglisi, Nagarajan Raghavan, **Kin Leong Pey**, "*A Comparative Analysis of Direct Leakage Current Compensation and Positive-Up-Negative-Down in the Characterization of Leaky Ferroelectric Structures*", 9th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference, 9-12 March 2025, Hong Kong, China.

165. **Invited K.L. Pey**, "*Dielectric Breakdown in 2D Hexagonal Boron Nitride*", Future of Semiconductors Forum 2025, 4-5 May 2025, KAUST, Saudi Arabia.

Self-aligned silicide (SALICIDE) and advanced Ni(alloy) germano/silicides for integrated circuits

166. C.W. Lim, M.H. Gao, W.P. Li and **K.L. Pey**, "*Self-aligned silicide process with two-step rapid thermal processing*", 4th annual technical conference on Assembly, Packaging and IC Technology, pp. 85-90, 1995, Singapore.

167. C.S. Ho, G. Karunasiri, S.J. Chua, **K.L. Pey**, H. Wong, K.H. Lee and L. Chan, "*Integration of SALICIDE process for deep-submicron CMOS technology: Effect of nitrogen/argon-amorphized implant on SALICIDE formation*", VLSI Multilevel Interconnection Conference (VMIC), pp. 396, 10-12 June 1997, Santa Clara, California, USA.

168. C.W. Lim, S.K. Lahiri, **K.L. Pey**, K.H. Lee, H. Wong, V.N. Chhagan, P.S. Tan, W.H. Chiu and L. Chan, "*Study of spacer architecture and current leakage issue of sub-micron self-aligned silicide process*", 7th International Symposium on IC Technology, Systems & Applications (ISIC), pp. 580-583, 10-12 September 1997, Singapore.

169. C.S. Ho, G. Karunasiri, S.J. Chua, **K.L. Pey**, H. Wong, K.H. Lee, Y. Tang, S.M. Wong and L. Chan, "*Effect of argon or nitrogen pre-amorphized implant on SALICIDE formation for deep-submicron CMOS technology*", Microlithographic Techniques in IC Fabrication, SPIE Vol. 3183, pp. 243-254, 25-26 June 1997, Singapore.

170. C.W. Lim, K.H. Lee, **K.L. Pey**, H. Gong, A.J. Bourdillon and S.K. Lahiri, "*Robustness of self-aligned titanium silicide process: improvement in yield of salicided devices with APM cleaning step*", 1st IEEE International Interconnect Technology Conference (IITC), pp. 187-189, 1-3 June 1998, San Francisco, California, USA.

171. C.W. Lim, H. Gong, A.J. Bourdillon, K.H. Lee, **K.L. Pey** and S.K. Lahiri, "*Incorporating of APM-clean step in Ti-salicide process: a method to achieve high yield in silicided logic devices*", 15th VLSI Multi-level Interconnect Conference (VMIC), pp. 278-280, 16-18 June 1998, Santa Clara, California, USA.

172. C.S. Ho, G. Karunasiri, S.J. Chua, **K.L. Pey**, S.Y. Siah, K.H. Lee and L.H. Chan, "*Correlation of film thickness and deposition temperature with PAI and the scalability of Ti-salicide technology to sub-0.18μm regime*", 1st IEEE International Interconnect Technology Conference (IITC), pp. 193-195, 1-3 June 1998, San Francisco, California, USA.

173. C.S. Ho, G. Karunasiri, S.J. Chua, **K.L. Pey,** K.H. Lee, L.H. Chan and S.Y. Siah, "*Implantation-induced degradation mechanism on PMOSFET series resistance for deep sub-micron titanium salicide process*", 15th VLSI Multi-level Interconnect Conference (VMIC), pp. 212-214, 16-18 June 1998, Santa Clara, California, USA.

174. C.S. Ho, G. Karunasiri, S.J. Chua, **K.L. Pey**, K.H. Lee, L.H. Chan and C.H. Tung, "*Process integration issues of a high-temperature Co/Ti salicide process for sub-quarter micron CMOS technology*", 15th VLSI Multi-level Interconnect Conference (VMIC), pp. 218-220, 16-18 June 1998, Santa Clara, California, USA.

175. H.N. Chua, **K.L. Pey**, S.Y. Siah, E.H. Lim, and C.S. Ho, "*Linewidth dependence of nano-void formation in Ti-Silicided BF_2 doped polysilicon lines*", Materials Research Society (MRS) Spring Meeting, vol. 564, pp. 91-95, 5-9 April 1999, San Francisco, California, USA.

176. H.N. Chua, **K.L. Pey**, S.Y. Siah, L.Y. Ong, E.H. Lim, C.L. Gan, K.H. See and C.S. Ho, "*Impact of voids in Ti-Salicided p^+ poly-silicon lines on $TiSi_2$ electrical properties*", 7th International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), pp. 44-49, 5-9 July 1999, Singapore.

177. E.H. Lim, S.Y. Siah, C.W. Lim, Y.M. Lee, F.H. Gn, R. Sunderesan and **K.L. Pey**, "*Degradation of pMOSFET series resistance due to Si implantation for Ti-salicide process*", SPIE, Microelectronic Device Technology, 21-22 September 1999, Santa Clara, California, USA.

178. C.S. Ho, **K.L. Pey**, C.H. Tung, K.C. Tee, S. Prasad, D. Saigal, J.J.L. Tan, H. Wong, K.H. Lee, T. Osipowitcz, S.J. Chua and R.P.G. Karunasiri, "*Thermal studies on stress-induced void-like defects in epitaxial-$CoSi_2$ formation*", Materials Research Society (MRS) Spring Meeting, vol. 564, pp. 109-116, 5-9 April 1999, San Francisco, California, USA.

179. P.S. Lee, **K.L. Pey**, D. Mangelinck, J. Ding, T. Osipowitcz, C.S. Ho, L. Chan and G.L. Chen, "*Characterization of Ni and Ni(Pt)-silicide formation on narrow polysilicon lines by Raman spectroscopy*", Materials Research Society (MRS) Fall Meeting, vol. 591, November 26 - December 3 1999, Boston, Massachusetts, USA.

180. S. Chattopadhay, **K.L. Pey**, W.K. Choi and D.Z. Chi, D.A. Antoniadis and E.A. Fitzgerald, "*Identification of deep level traps in a compositionally graded n-$Si_{0.75}Ge_{0.25}$ alloy using Ti Schottky diode*", International Conference on Communication, Computer and Devices (ICCCD), 14-16 Dec 2000, IIT Kharagpur, India.

181. Y.N. Tan, D.Z. Chi, **K.L. Pey**, C.S. Ho, P.S. Lee, S.J. Chua and S. Lahiri, "*Study of defects in advanced Ti-salicidation schemes using DLTS*", Proceeding for the International Workshop on Advances in Materials Science and Technology, pg.120, 3-6 April 2000, Singapore.

182. W.K. Choi, **K.L. Pey**, H.B. Zhao, T. Osipowitcz and Z.X. Shen, "*Nickel silicidation on polycrystalline silicon germanium films*", 8th International Conference on Electronic Materials, 10-14 June 2002, Xian, China.

183. J. Y. Y. Chaw, **K. L. Pey**, P. S. Lee, D. Z. Chi and J. P. Liu," *Study of Ni(Pt) germanosilicides formation on fully-strained $Si_{0.9}Ge_{0.1}$ and $Si_{0.899}Ge_{0.1}C_{0.001}$ by Raman Spectroscopy*", Materials Research Society (MRS) Meeting, Volume 810, pages 13–18, 2003, 21-25 April 2003, San Francisco, California, USA.

184. L. J. Jin, **K. L. Pey**, W. K. Choi, E. A. Fitzgerald, D. A. Antoniadis, A. J. Pitera, M. L. Lee and D. Z. Chi, "*Study of Ge Out-diffusion During Nickel (Platinum ~ 0, 5, 10 at.%) Germanosilicide Formation*", Materials Research Society (MRS) Spring Meeting, Vol. 810, pages 213–218, 21-25 April 2003, San Francisco, California, USA.

185. Y.S. Li, P.S. Lee and **K.L. Pey,** "*Ti/Co and Co/Ti silicidation of poly-Si capped poly-$Si_{0.7}Ge_{0.3}$ substrate*", International Conference on Materials for Advanced Technologies (ICMAT), 8-12 December 2003, Singapore.

186. N.G. Toledo, P.S. Lee and **K.L. Pey**, "*Characterization of junction leakage of Ti-capped Co- and Ni-silicided junctions*", International Conference on Materials for Advanced Technologies (ICMAT), 8-12 December 2003, Singapore.

187. L.J. Jin, **K.L. Pey**, W.K. Choi, E.A. Fitzgerald, D.A. Antoniadis, D.Z. Chi and C.H. Tung, "*The interfacial reaction of Ni on (111) Ge & (100) Si*", International Conference on Materials for Advanced Technologies (ICMAT), 8-12 December 2003, Singapore.

188. **Invited** **K.L. Pey,** P.S. Lee and D. Mangelinck, "*Ni(Pt) alloy silicidation on (100) Si and poly-silicon lines*", International Conference on Materials for Advanced Technologies (ICMAT), 8-12 December 2003, Singapore.

189. M. Yeadon, R. Nath, C.B. Boothroyd, D.Z. Chi, **K.L. Pey**, W.K. Choi, E.A. Fitzgerald and D. Antoniadis, "*Formation and Agglomeration of Nickel Monosilicide on Si and $Si_{0.76}Ge_{0.24}$ (001)*", Materials Research Society (MRS) Fall Meeting, 1-5 December 2003, Boston, Massachusetts, USA.

190. L.J. Jin, **K.L. Pey**, W.K. Choi, E.A. Fitzgerald, D.A. Antoniadis, A.J. Pitera, M.L. Lee and D.Z. Chi, "*Study of Nickel (Platinum) (Pt at. % = 0, 5, 10) Germanosilicide formation using micro-Raman spectroscopy*", Materials Research Society (MRS) Spring Meeting, 12-16 April 2004, San Francisco, California, USA.

191. J.Y.Y. Chaw, **K.L., Pey**, P.S. Lee, D.Z. Chi and J.P. Liu, "*Study of Ni(Pt) germanosilicides formation on fully-strained $Si_{0.9}Ge_{0.1}$ and $Si_{0.899}Ge_{0.1}C_{0.001}$ by Raman Spectroscopy*", Materials Research Society (MRS) Spring Meeting, 12-16 April 2004, San Francisco, California, USA.

192. **K.L. Pey**, PS Lee and DZ Chi, "*Advanced Silicide/Germanosilicide Materials*"(Poster), UK-Singapore Partners in Science Symposium, 12-15 September 2005, A*STAR Biopolis, Singapore.

193. Y. Setiawan, P.S. Lee, C.W. Tan, and **K.L. Pey**," *Effect of Ti alloying in nickel silicide formation*", International Conference on Materials for Advanced Technologies (ICMAT), 4-8 July 2005, Singapore.

194. E.J. Tan, M.L. Kon, **K.L. Pey**, P.S. Lee, Y. W. Zhang, W.D. Wang, and D.Z. Chi, "*Effects of Si(001) surface amorphization on $ErSi_2$ thin film*", International Conference on Materials for Advanced Technologies (ICMAT), 4-8 July 2005, Singapore.

195. L. J. Jin, **K.L. Pey**, W.K. Choi, D.A. Antoniadis, E.A. Fitzgerald and D.Z. Chi, "*Electrical characterization of platinum and palladium effects in nickel monosilicide/n-Si Schottky contacts*", International Conference on Materials for Advanced Technologies (ICMAT), 4-8 July 2005, Singapore.

196. Y. Setiawan, P.S. Lee, **K.L. Pey**, X.C. Wang and G.C. Lim, "*Ni silicide formation in Ni(Ti)/Si using multiple pulsed laser annealing*", 208th Meeting of ECS, 16-21 October 2005, Los Angeles, California, USA.

197. R. Das, A.R. Saha, L.J. Jin, **K.L. Pey**, W.K. Choi, D.A. Antoniadis, E.A. Fitzgerald, S. Chattopadhyay, S. Saha, C. Bose and C.K. Maiti, "*Studies on the Electrical Characteristics of Ni and NiPt-alloy Silicided Schottky diodes*", URSI GA 2005, XXVIII th General Assembly, 23-29 October 2005, New Delhi, India.

198. **Invited** D.Z. Chi, R.T.P. Lee, M. Bouville, H.B. Yao, E.J. Tan and **K.L. Pey**, "*Addressing materials and integration issues for silicide contact metallization in nano-scale CMOS devices*", Asia-Pacific Conference on Semiconducting Silicides: Science and Technology Towards Sustainable Optoelectronics (APAC-SILICIDE), 29-31 July 2006, Kyoto, Japan.

199. **K.L. Pey**, L.J. Jin, W.K. Choi, H.P. Yu, D.A. Antoniadis, E.A. Fitzgerald, D.Z. Chi and D.M. Isaacson, "*Ni(alloy)-germanosilicide contact technology for $Si_{1-x}Ge_x$ (x=0.20-0.5) junctions*", 2006 International conference on Solid State Devices and Materials (SSDM), pp. 338-339, 12-15 September 2006, Yokohama, Japan.

200. E. J. Tan, M. Bouville, D. Z. Chi, **K.L. Pey**, David J. Srolovitz, P.S. Lee and C.H. Tung, "*Pyramidal structural Defects in Er-silicide thin film and their elimination*", Computational Materials Science Research Workshop, 20 March 2007, A*STAR IMRE, Singapore.

201. H.P. Yu, **K.L. Pey**, W.K. Choi, D.A. Antoniadis, E.A. Fitzgerald, M.K. Dawood, K.Q. Ow and D.Z. Chi, "*Full range workfunction tuning of MOSFETs using interfacial yttrium layer in fully germanided Ni gate*", 211th Meeting of the Electrochemical Society 2007, 6-10 May 2007, Chicago, USA.

202. E.J. Tan, **K.L. Pey**, N. Singh, G.Q. Lo, D.Z. Chi, K.M. Hoe, P.S. Lee and, G.D. Cui, "*Silicon nanowire Schottky barrier NMOS transistors*", 2007 International Conference on Solid State Devices and Materials (SSDM), 18-21 September 2007, Tsukuba, Ibaraki, Japan.

203. E.J. Tan, **K.L. Pey**, D.Z. Chi, P.S. Lee, and Y. Li, "*Effect of TiN and TiN/Ti capping on the structural and electrical properties of rare earth silicides*", International Conference on Materials for Advanced Technologies (ICMAT), Singapore, 1-6 July 2007, Singapore.

204. E.J. Tan, **K.L. Pey**, N. Singh, G.Q. Lo, D.Z. Chi, Y.K. Chin, L.J. Tang, "*Erbium/Platinum silicided gate-all-around silicon nanowire Schottky source/drain MOSFETs*", 2008 International Conference on Solid State Devices and Materials (SSDM), 24-26 September 2008, Tsukuba, Ibaraki, Japan.

Pulsed laser annealing for ultrashallow junction and metal-silicide formation

205. Y.F. Chong, **K.L. Pey**, A.T.S. Wee, A. See, C.H. Tung, R. Gopalakrishnan and Y.F. Lu, "*Application of excimer laser annealing in the formation of ultra-shallow p^+/n junctions*", International Symposium on Microelectronics and Assembly, 27 November – 2 December 2000, Singapore. Also, at Proceeding of SPIE on Microelectronic Yield, Reliability, and Advanced Packaging, vol. 4227, p. 124, 2000.

206. Y.F. Chong, **K.L. Pey**, A.T.S. Wee, A. See, C.H. Tung, R. Gopalakrishnan and Y.F. Lu, "*Fundamental issues in rapid thermal annealing (RTP), spike RTA and excimer laser annealing (ELA) for the formation of shallow p^+/n junction*", 199th Meeting of Electrochemical Society Meeting, Vol. 2001-9, p. 311, 2001, 25-30 March 2001, Washington, DC, USA.

207. **Invited** **K.L. Pey**, "*Ultra-shallow junction formation for sub-100nm technologies using pulsed excimer laser*", Workshop and IEEE EDS Mini-colloquium on Nanometer CMOS Technology (3rd WIMNACT-Singapore), 15 Oct 2003, Singapore.

208. K.K. Ong, **K.L. Pey**, P.S. Lee, K.L. Yeo, A.T.S. Wee, Y.F. Chong, and X.C. Wang, "*Formation of ultra-shallow p+/n junctions in silicon-on-insulator (SOI) substrate using laser annealing*", E-MRS 2004 Spring Meeting, 24-28 May 2004, Strasbourg, France.

209. **Invited** **K.L. Pey**, "*Pulsed laser annealing for the formation of ultra-shallow junctions for advanced semiconductor technology*", Workshop on Fundaments and Applications of Laser Processing for Highly Innovative (FLASH) MOS Technology, 21 Jan 2005, Rome, Italy.

210. **K.L. Pey** and PS Lee, "*Pulsed Laser Annealing in Advanced Nano-CMOS Processing*"(Poster), UK-Singapore Partners in Science Symposium, 12-15 September 2005, A*STAR Biopolis, Singapore.

211. **Invited** **K.L. Pey**, K.K. Ong, P.S. Lee, A.T.S. Wee, X.C. Wang, Y.F. Chong, "*Thermal confinement of advanced semiconductor substrates during laser annealing*", Conference on Semiconductor Technology (ISTC2005), pp. 77-83, 15-17 March 2005, Shanghai, China.

212. K.K. Ong, **K.L. Pey**, P.S. Lee, A.T.S. Wee, Y.F. Chong, and X.C. Wang, "*Dopant retention and electrical activation induced by laser annealing in boron implanted crystalline and preamorphized silicon*", International Conference on Materials for Advanced Technologies (ICMAT), 4-8 July 2005, Singapore.

213. **K.L. Pey**, K.K. Ong, P.S. Lee, A.T.S. Wee, X.C. Wang, Y.F. Chong, L.H. Wong and C.C. Wong, **"***Enhanced dopant activation in strained-Si/$Si_{1-x}Ge_x$ substrate using non-melt laser annealing*", ECS Transactions, Volume 1, Solid-State Joint General Poster Session, 208th Meeting of ECS, 16-21 October 2005, Los Angeles, California, USA.

214. Y. Setiawan, P.S. Lee, **K.L. Pey**, X.C. Wang, G.C. Lim, F.L. Chow, "*Laser annealed Ni(Ti) silicides formation*", 14th International Conference on Advanced Thermal Processing of Semiconductors - RTP2006, pp. 223-227, 10-13 October 2006, Kyoto, Japan.

215. Y. Huang, **K.L. Pey**, D.Z. Chi, K.K. Ong, P.S. Lee, I.S. Goh, "*Work function adjustment using thin metal film (Ti, Pd) under FUSI gate electrode and laser annealing*", 2006 International conference on Solid State Devices and Materials (SSDM), pp 220-221, 12-15 September 2006, Yokohama, Japan.

216. **Invited** **K.L. Pey**, "*Silicided Hyper-shallow p+/n- Junctions Formed by Pulsed Laser Annealing for Nanoelectronic Devices*", 13th WIMNACT-Hong Kong/Singapore Workshop an IEEE EDS Mini-Colloquium on NAnometer CMOS Technology, 23 July 2007, Hong Kong and 25 July 2007, Singapore.

217. Y. Setiawan, P.S. Lee, S. Balakumar, **K.L. Pey**, X.C. Wang, "*Laser annealed Ni germanosilicide on SiGe substrates (Ge≈40%)*", Materials Research Society Meeting (MRS) Spring Meeting, 9-13 April 2007, San Francisco, California, USA.

218. Y. Setiawan, P.S. Lee, **K.L. Pey**, X.C. Wang, B.L. Tan, "*Formation of abrupt Ni(Pt) germanosilicide interface through laser induced self-limiting melting phenomenon in $Si_{1-x}Ge_x/Si$ heterostructure*", E-MRS 2007 Spring Meeting, 28 May - 1 June 2007, Strasbourg, France.

219. **Invited** **K.L. Pey**, K.K. Ong, P.S. Lee, Y. Setiawan, X.C. Wang, A.T.S. Wee and G.C. Lim, "*Formation of silicided hyper-shallow p^+/n^- junctions by pulsed laser annealing*", 212th Meeting of the Electrochemical Society, 7-12 October 2007, Washington, DC, USA.

220. S.H. Yeong, B. Colombeau, C.H. Poon, K.R.C. Mok, A. See, F. Benistant. D.X.M. Tan, **K.L. Pey**, C.M. Ng, L. Chan and M.P. Srinivasan, "*An extensive study on the boron junctions formed by optimized prior RTA/multiple-pulse flash lamp annealing (FLA) schemes: Junction Formation, Stability and Leakage*", 17th International Conference on Ion Implantation Technology, Volume 1066, pp. 47-50, 8-13 June 2008, Monterey, California, USA.

221. S.H. Yeong, D.X.M. Tan, B. Colombeau, L. Chan, **K.L. Pey**, J. P. Liu and M.P. Srinivasan, "*Dopant diffusion and activation in SiGe/SiGeC layers and the incorporation of high energy silicon implantation with RTA and pulsed laser annealing*", 17th International Conference on Ion Implantation Technology, 8-13 June 2008, Monterey, California, USA.

222. D.X.M. Tan, **K.L. Pey**, B. Colombeau, K.K. Ong, C.M. Ng, S.H. Yeong, A.T.S. Wee, C.J. Liu and X.C. Wang, "*Advanced defect engineering in pre-amorphized Si substrate with laser pre-irradiation optimization*", 17th International Conference on Ion Implantation Technology, pg. 28, 8-13 June 2008, Monterey, California, USA.

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308. **Invited** **K.L. Pey**, "*Important of semiconductor technologies in industry 4.0 and smart applications",* 2019 MoE Smart Nation Conference for Teacher, 28 - 29 May 2019, Singapore.

309. **Invited** **K.L. Pey**, "*Imagining new educational approaches in Industry 4.0*", CPG 2019 World Summit, National Design Centre, 20-21 June 2019, Singapore.

310. Tommaso Zanotti, Alok Ranjan, Sean J O'Shea, Nagarajan Raghavan, Ramesh Thamankar, **Kin Leong Pey**, Francesco Maria Puglisi, "*Reliability Analysis of Random Telegraph Noise based True Random Number*

Generators", 2023 IEEE International Integrated Reliability Workshop (IIRW), South Lake Tahoe, California, USA, 6 – 10 October 2023.

311. Mizuki Kondo, Ryosuke Kozaki, Shigetomo Kyogoku, Tsugumi Oshiro, Kenya Bannaka, **Pey Kin Leong**, Kunihiko Takamatsu, Kenichiro Mitsunari & Yasuo Nakata, "*New Proposal Active Learning STEAM/Data Science Education in the Age of Industry 5.0 and Society 5.0 Applied Sports and Exercise Instruction Based on Eduinformatics*", Proceedings of Ninth International Congress on Information and Communication Technology (ICICT 2024), Vol. 9, pp 525–535, 19-22 February 2024, London, UK.

312. Kunihiko Takamatsu, Sayaka Matsumoto, Nobuko Miyairi, **Kin-Leong Pey**, Alison Elizabeth Lloyd, Roy Tan, Eng Hong Ong, Jingwen Mu, Fiona Rebecca Sutherland, Mun Heng Tsoi, Sin Yi Yap, Hidekazu Iwamoto, Tokuro Matsuo, Noriko Ito, Tsunenori Inakura, Shotaro Imai, Nobuhiko Seki, Ford Lumban Gaol, Takafumi Kirimura, Taion Kunisaki, Kenya Bannaka, Ikuhiro Noda, Ryosuke Kozaki, Aoi Kishida, Katsuhiko Murakami, Yasuo Nakata, Masao Mori, "*Expanding Knowledge Networks in Higher Education by Abduction-Driven Management Faculty Based on Eduinformatics*", 10th International Conference on ICT for Intelligent Systems (ICTIS - 2025), 23 - 24 May, 2025, New York, USA.

Higher education innovation and transformation

313. K.L. Wood, R.E. Mohan, S. Kaijima, S. Dritsas, D.D. Frey, C.K. White, D.D. Jenson, R.H. Crawford, D. Moreno and **K.L. Pey**, "*A Symphony of Designiettes: Exploring the Boundaries of Design Thinking in Engineering Education*", ASEE Annual Conference & Exposition, 10-13 June 2012, San Antonio, Texas, USA.

314. **Invited Keynote** **K.L. Pey**, "*An innovative pedagogy for 21st century technically grounded leaders and innovators – SUTD's experience*", The 2nd Annual International Higher Education Faculty Marketing Innovation Forum, 18 - 19 February 2014, Pan Pacific Orchard, Singapore.

315. **Invited Keynote** **K.L. Pey**, "*Educating Technology-Grounded Leaders and Innovators*", 7th Annual Higher Education Summit Asia, 19 - 20 October 2015, Grand Corpthorne Waterfront Hotel, Singapore.

316. **Invited** **K.L. Pey**, "*Creating an innovative and collaborative culture for 21st Education*", Higher Education Leaders Asia Forum 2016, 24-25 February 2016, Kuala Lumpur, Malaysia.

317. **Invited Keynote** **K.L. Pey**, "*Innovative Learning Culture - How to Make The Change?*", 7th Annual Higher Education Summit, Asia, 19 - 21 October 2015, Grand Corpthorne Waterfront Hotel, Singapore.

318. N. Sockalingam and **K.L. Pey**, "*SOTL based Strategic Pedagogical Development Initiatives in a Millennial University: The SUTD Experience*", 2nd EuroSoTL conference, 8-9 June 2017, Lund, Sweden (https://konferens.ht.lu.se/fileadmin/_migrated/content_uploads/Sockalingam_Pey.pdf).

319. **Invited** **K.L. Pey**, "*How to enrich student's learning experience?*", Higher Education Planning in Asia (HEPA) Forum, 21-22 March 2017, Tokyo, Japan.

320. U.X. Tan, Y. Zhu, C.H. Lee, T.M. Toh, G.K. Sze, S. Tay, D. Wong and **K.L. Pey**, "*Preliminary study of integrated physics and mathematics bridging course*", IEEE Global Engineering Education Conference (EDUCON 2017), 25-28 April 2017, Athens, Greece.

321. **Invited** **K.L. Pey**, "*Preparing Programmes for Outcome-based Accreditation*", ASEAN Engineering Deans Summit (AEDS) under 36th Conference of the ASEAN Federation of Engineering Organisations (CAFEO 36), 12 - 14 November 2018, Resorts World Sentosa, Singapore.

322. **K.L. Pey**, "*Curriculum Organization and the Cohort Classroom Model*", SIAM conference on Applied Math Education – Mini-symposium on "An Integrated Cohort Approach to Design and Technology Education: One School's Story", 9-11 July 2018, Portland, Oregon, USA.

323. **Invited Keynote** **K.L. Pey**, "*A technical education for 21st century*", Digital Campus Learning Transformation: Immersive AR/VR, Blended Learning Innovations, Analytics & Next Generation Learning Spaces, International Summit 2018, 14-15 August 2018, Singapore.

324. O. Kurniawan, N.T.S. Lee, S. Datta, N. Sockalingam, **K.L. Pey**, "*Effectiveness of Physical Robot Versus Robot Simulator in Teaching Introductory Programming*", IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE), Conference Theme: Engineering Next-Generation Learning, page 486, 4-7 December 2018, Wollongong, NSW, Australia.

325. **Invited** **K.L. Pey**, "*SUTD 4D Big-D Curriculum"*, 2018 SEFL Annual Conference, 17-21 September, Copenhagen, Denmark (SEFI2018_call-for-papers_final-update-002.pdf).

326. Nachamma Sockalingam and **K.L. Pey**, "*Empowering Future Ready Graduates: The SUTD Way"*, Asia-Pacific Association for International Education (APAIE), 25-29 March 2018, Singapore.

327. **Invited Keynote** **K.L Pey**, "*Singapore University of Technology and Design – a transformative engineering and architecture education for 21st century*", 1st International Conference on Technology and Design (ICTD2019) and Chinese Congress on Innovation Design Summit, 25-26 April 2019, Hangzhou, China.

328. **Invited K.L. Pey**, "*Transforming the 21st century education for technically-grounded leaders and innovators*", 1st International Conference on Improving University Teaching, 29 October 2019, Hanyang University, Seoul, South Korea.

329. Oka Kurniawan, Norman Tiong Seng Lee, Nachamma Sockalingam and **Kin Leong Pey** "*Game-Based versus Gamified Learning Platform in Helping University Students Learn Programming*", ASCILITE 2019 Conference Proceedings: Personalised Learning, Diverse Goals, and One Heart, pp 159-169, 2-5 December 2019, Singapore.

330. **Invited K.L. Pey**, L. Blessing and B. Tuncer, "*A transformative engineering and architecture education*", 2020 IEEE Frontiers in Education Conference (FIE), 21-24 October 2020, Uppsala, Sweden (virtual due to COVID-19).

331. **Invited K.L. Pey**, "*Preparing Future Graduates for the Digital Economy – SUTD's Model*", 2nd (Virtual) Colloquium on the Global State of the Art in Engineering Education, 30 November – 4 December 2020, organized by UCL in London, UK.

332. **Invited K.L. Pey**, "*How SUTD incorporates Design and AI into its Undergraduate Programme and Growth Sectors*", 8th SUTD-MIT IDC Design Summit and & 2nd International Conference on Technology and Design 2020 (ICTD), 13-15 January 2020, Singapore.

333. **Invited K.L. Pey**, "*SUTD innovative engineering education*", 7th The International Conference on Science, Education, and Viable Engineering (ICSEVEN 2020), 5-8 November 2020, Penghu, Taiwan (virtual due to COVID-19).

334. **Invited K.L. Pey**, "*SUTD campusX – a new form of cyber-physical learning*", 10th The International Conference on Science, Education, and Viable Engineering (10th ICSEVEN 2022), 23-26 June 2022, Yilan, Taiwan.

335. **Invited K.L. Pey**, "*campusX - A Human-Centric Cyber-Physical Learning Platform*", Global Lifelong Learning Summit (GLLS), 1 - 2 November 2022, Singapore.

336. **Invited Keynote K.L Pey**, "*A Design-centric and Interdisciplinary Curriculum for 21st Century Engineering Education*", 17th International Symposium on Science and Education Development Strategy on "Training of outstanding engineers for the future", 9 December 2022, Hangzhou, China (delivered via Zoom).

337. **Invited Keynote K.L. Pey**, "*SUTD campusX – a new form of cyber-physical learning*", 13th The International Conference on Science, Education, and Viable Engineering (ICSEVEN 2023), 8-12 November 2023, Bangkok, Thailand.

338. Nachamma Sockalingam, Kenneth Lo and **Kin Leong Pey**, "*SUTD campusX: An Institutional Digital Transformation Approach to Higher Education",* 2023 World Engineering Education Forum - Global Engineering Deans Council (WEEF-GEDC), 23-27 October 2023, Monterrey, Mexico.

339. **Kin Leong Pey**, "*Cyber-physical learning for design-centric team-based pedagogy",* a workshop presented at 2023 World Engineering Education Forum - Global Engineering Deans Council (WEEF-GEDC), 23-27 October 2023, Monterrey, Mexico.

340. Kenneth Lo and **K.L. Pey**, "*SUTD campusX: cyber-physical learning for a sustainable future education*", Higher Education Planning in Asia (HEPA) Forum, 13-14 April 2023, Sunshine Coast, Australia.

341. Kenneth Lo and **K.L. Pey**, "*Future Skills Outside Classroom for Sustainable Higher Education*", Higher Education Planning in Asia (HEPA) Forum, 13-14 April 2023, Sunshine Coast, Australia.

342. **Invited K.L. Pey**, "*SUTD campusX – a new form of cyber-physical learning*", IHL CIO Forum 2023, 27 February - 3 March 2023, Singapore.

343. **Invited** **K.L. Pey**, "*CampusX - A Human-Centric Cyber-Physical Learning Platform*", 9th International Conference on Educational Innovation (CIIE 2023), 16-18 January 2023, Tecnológico de Monterrey, Monterrey, Mexico.

344. **Invited** **K.L. Pey**, "*Learning ANYWHERE using Cyber-Physical Learning Technology for Future Learning*", Adult Learning Exchange 2024 (ALX 2024), Our Learning Futures: Learn Fast, Learn Wide, Learn Well, 18-19 January 2024, Singapore.

345. **Invited** **K.L. Pey**, "*Singapore University Technology and Design*", New Global Universities Summit (The New Global Universities Summit), 26-28 June 2024, Duke in DC, USA.

Book Chapters

1. **K.L. Pey**, D.S.H. Chan and J.C.H. Phang, "*A simulation model for studying cathodoluminescence emissions"*, in Computational Methods in Engineering Advances and Applications, Scientific Publishing Co., pp. 821-826, 1992.

2. **K.L. Pey** and P.S. Lee, "*Pulsed laser annealing technology for nanoscale fabrication of silicon-based devices in semiconductors*", pp. 327-364, in the book entitled "Advances in laser materials processing - technology, research and applications", Woodhead Publishing Limited, 2010.

3. N. Raghavan and **K.L. Pey**, "*Reliability of emerging nanodevices*", pp. 143-168, in the book entitled "Reliability Characterization of Electrical and Electronic Systems" edited by Jonathan Swingler, Woodhead Publishers UK, 2015.

4. J. Suňé, N. Raghavan and **K.L. Pey**, "*Dielectric breakdown processes*", in the book entitled "Resistive switching – from fundamentals of nanoionic redox processes to memristive device applications", Wiley Publications, 2016.

5. K. Shubhakar, S.J. O'Shea and **K.L. Pey**, "*Characterization of Grain Boundaries in Polycrystalline HfO_2 Dielectrics: Applications in Nanomaterials*", in the book entitled "Conductive Atomic Force Microscopy", edited by Mario Lanza, Wiley Publications, 2017.

6. A. Ranjan, N. Raghavan, K. Shubhakar, S.J. O'Shea and **K.L. Pey**, "*Random telegraph noise nano-spectroscopy in high-k dielectrics using scanning probe microscopy techniques*", pp 417–440, in book entitled "Noise in Nanoscale Semiconductor Devices", edited by Tibor Grasser, Springer, 2020.