Youngki Yoon, Ph.D.

University of Waterloo
200 University Avenue West
Waterloo, ON, N2L 3G1, Canada

Office: QNC 5623
Tel: (519) 888-4567 Ext. 31860
Email: youngki.yoon@uwaterloo.ca

APPOINTMENTS

Associate Professor Jul 2019 – Present
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON, Canada

Director Sep 2018 – Aug 2020
Nanotechnology Engineering Program
University of Waterloo, Waterloo, ON, Canada

Assistant Professor Apr 2013 – Jun 2019
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON, Canada

Postdoctoral Associate Jan 2009 – Mar 2013
Department of Electrical Engineering and Computer Sciences
University of California, Berkeley, CA, USA
Adviser: Prof. Sayeef Salahuddin

EDUCATION

Ph.D. in Electrical and Computer Engineering Jan 2006 – Dec 2008
University of Florida, Gainesville, FL, USA
Thesis: Carbon Nanotube and Graphene Device Modeling and Simulation
Adviser: Prof. Jing Guo

M.S. in Electrical and Computer Engineering Sep 2003 – Dec 2005
University of Florida, Gainesville, FL, USA

B.E. in Metallurgical Engineering Mar 1994 – Feb 1999
Korea University, Seoul, South Korea

AWARDS & RECOGNITIONS

- Faculty of Engineering Distinguished Performance Award. 2022
- A paper on ultrascaled HfS_2 transistors with uniaxial strain [J6] was highlighted as Editors' Picks and a cover article for *IEEE Electron Device Letters* (vol. 43, issue no. 7). 2022
- Best Poster Award at the Nano Ontario Conference [P2] 2022
- Marsland Family Award from the University of Waterloo. 2021
- Outstanding Performance Award from the University of Waterloo. 2020
- Early Researcher Award (ERA) from the Ministry of Research, Innovation and Science (MRIS) of Ontario. 2018
- WIN Research Leader Award. 2018
- Research on molybdenum diselenide ($MoSe_2$) gas sensors [J31] was selected to be a cover article for *Nano Research* (vol. 10, issue no. 6). 2017

- Letters of appreciation from the Dean of Engineering and the Associate Dean of Teaching for teaching excellence (NE 471 taught in F2015, F2016, F2021). 2016, 2017, 2022
- Research on multilayer molybdenum disulfide (MoS_2) phototransistors [J36] was selected to be a cover article for *Advanced Materials* (vol. 27, issue no. 13). 2015
- A paper on barrier-free tunneling [J43] was recognized as one of 50 notable groundbreaking research papers (out of all papers published in *Applied Physics Letters* from 2009 through 2012) by the editors of *Applied Physics Letters* (one of the most renowned journals in Applied Physics). 2012
- Research on rough-edge graphene nanoribbon tunnel transistors [J39] was selected to be a cover article for *Applied Physics Letters* (vol. 101, issue no. 26). 2012
- Research on barrier-free tunneling [J43] was selected to be a cover article for *Applied Physics Letters* (vol. 97, issue no. 3). 2010
- Honors Scholarship from Korea University, awarded for Dr. Yoon's academic excellence. 1996

PUBLICATIONS

1. Articles in Refereed Journals

[J1] H. Cho, **M. Sritharan***, Y. Ju, P. Pujar, R. Dutta, S. Hong, Y. Yoon and S. Kim, "Se-vacancy Healing with Substitutional Oxygen in WSe_2 for High Mobility p-type Field-Effect Transistors," *ACS Nano*, in press (2023).

[J2] **M. Sritharan***, **H. Lee***, **R. K. A. Bennett***, and Y. Yoon, " Design Considerations for Engineering HfS_2 Negative Capacitance FET through Multilayered Channel and $Hf_{1-x}Zr_xO_2/HfO_2$ Double-Gate Stacks: an Ab Initio and NEGF Study," *Journal of Computational Electronics*, in press (2023).

[J3] H. Park, A. Sen, **M. Kaniselvan***, **A. AlMutairi***, A. Bal, L. P. Lee, Y. Yoon, and S. Kim, "A Wafer-Scale Nanoporous 2D Active Pixel Image Sensor Matrix with High Uniformity, High Sensitivity, and Rapid Switching," *Advanced Materials*, vol. 35, p. 2210715 (2023).

[J4] **H. Lee***, **M. Sritharan***, and Y. Yoon, "A Computational Framework for Gradually Switching Ferroelectric-Based Negative Capacitance Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 69, no. 10, pp. 5928-5933 (2022).

[J5] C. Gilardi, R. K. A. Bennett, Y. Yoon, E. Pop, H.-S. P. Wong, and S. Mitra "Extended Scale Length Theory for Low-Dimensional Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 69, no. 9, pp. 5302-5309 (2022).

[J6] **(Editors' Picks) (Cover Article) M. Kaniselvan***, **M. Sritharan***, and Y. Yoon, "Mitigating Tunneling Leakage in Ultrascaled HfS_2 pMOS Devices with Uniaxial Strain," *IEEE Electron Device Letters*, vol. 43, no. 7, pp. 1133-1136 (2022).

[J7] **H. Lee*** and Y. Yoon, "Simulation of Negative Capacitance Based on the Miller Model: Beyond the Limitation of the Landau Model," *IEEE Transactions on Electron Devices*, vol. 69, no. 1, pp. 237-241 (2022).

[J8] H. Park, J. Lee, **G. Han***, **A. AlMutairi***, Y.-H. Kim, J. Lee, Y.-M. Kim, Y. J. Kim, Y. Yoon and S. Kim, "Nano-patterning on Multilayer MoS_2 via Block Copolymer Lithography for Highly Sensitive and Responsive Phototransistors," *npj Communications Materials*, vol. 2, article number 94 (2021).

[J9] **M. Kaniselvan*** and Y. Yoon, "Strain-Tuning $PtSe_2$ for High ON-Current Lateral Tunnel Field-Effect Transistors," *Applied Physics Letters*, vol. 119, no. 7, p. 073102 (2021).

[J10] **R. K. A. Bennett*** and Y. Yoon, "Exploiting Fringing Fields Created by High-κ Gate Insulators to Enhance the Performance of Ultrascaled 2-D-Material-Based Transistors," *IEEE Transactions on Electron Devices*, vol. 68, no. 9, pp. 4618-4624 (2021).

[J11] **D. Yin*** and Y. Yoon, "Performance Optimization of Monolayer 1T/1T'-2H MoX_2 Lateral Heterojunction Transistors," *IEEE Transactions on Electron Devices*, vol. 68, no. 7, pp. 3649-3657 (2021).

[J12] **R. K. A. Bennett*** and Y. Yoon, "Using Anisotropic Insulators to Engineer the Electrostatics of Conventional and Tunnel Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 68, no. 2, pp. 865-872 (2020).

[J13] **G. Han***, **M. Kaniselvan***, and Y. Yoon, "Photoresponse of $MoSe_2$ Transistors: A Fully Numerical Quantum Transport Simulation Study," *ACS Applied Electronic Materials*, vol. 2, no. 11, pp. 3765-3772 (2020).

[J14] **G. Radhakrishnan***, Y. Yoon, and M. Sachdev, "Monitoring Aging Defects in STT-MRAMs," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 39, no. 12, pp. 4645-4656 (2020).

[J15] **R. K. A. Bennett***, **D. Yin***, and Y. Yoon, "Assessing the Role of a Semiconductor's Anisotropic Permittivity in Hafnium Disulfide Monolayer Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 67, no. 6, pp. 2607-2613 (2020).

[J16] M. Naqu, **M. Kaniselvan***, S. Choo, **G. Han***, S. Kang, J. Kim, Y. Yoon, and S. Kim, "Ultrasensative Multilayer MoS_2-Based Photodetector with Permanently Grounded Gate Effect," *Advanced Electronic Materials*, vol. 6, no. 4, p. 1901256 (2020).

[J17] **H. Lee*** and Y. Yoon, "Modeling of Hysteretic Jump Points in Ferroelectric MOS Capacitors," *IEEE Transactions on Electron Devices*, vol. 66, no. 7, pp. 3093-3098 (2019).

[J18] **G. Radhakrishnan***, Y. Yoon, and M. Sachdev, "A Parametric DFT Scheme for STT-MRAMs," *IEEE Transactions on Very Large Scale Integration Systems*, vol. 27, no. 7, pp. 1685-1696 (2019).

[J19] W. Choi, **D. Yin***, S. Choo, S.-H. Jeong, H.-J. Kwon, Y. Yoon, and S. Kim, "Low-Temperature Behaviors of Multilayer MoS_2 Transistors with Ohmic and Schottky Contacts," *Applied Physics Letters*, vol. 115, no. 3, p. 033501 (4 pages) (2019).

[J20] H. Im, **A. AlMutairi***, S. Kim, **M. Sritharan***, S. Kim, and Y. Yoon, "On MoS_2 TFT Design Consideration for NO_2 Gas Sensor," *ACS Sensors*, vol. 4, no. 11, pp. 2930-2936 (2019).

[J21] **A. AlMutairi*** and Y. Yoon, "Device Performance Assessment of Monolayer $HfSe_2$: A New Layered Material Compatible with high-κ HfO_2," *IEEE Electron Device Letters*, vol. 39, no. 11, pp. 1772-1775 (2018).

[J22] **Y. Zhao***, **D. Yin***, and Y. Yoon, "Intrinsic Performance of Germanane Schottky Barrier Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 65, no. 10, pp. 4188-4195 (2018).

[J23] S. Kim, J. Maassen, J. Lee, S. M. Kim, **G. Han***, J. Kwon, S. Hong, J. Park, N. Liu, Y. C. Park, I. Omkaram, J.-S. Rhyee, Y. K. Hong, and Y. Yoon, "Interstitial Mo-Assisted Photovoltaic Effect in Multilayer $MoSe_2$ Phototransistors," *Advanced Materials*, vol. 30, no. 12, p. 1705542 (9 pages) (2018).

[J24] **A. AlMutairi***, **D. Yin***, and Y. Yoon, "$PtSe_2$ Field-Effect Transistors: New Opportunities for Electronic Devices," *IEEE Electron Device Letters*, vol. 39, no. 1, pp. 151-154 (2018).

[J25] H. Park[†], **G. Han***[,†], S. W. Lee, H. Lee, S. H. Jeong, M. Naqi, **A. AlMutairi***, Y. J. Kim, J. Lee, W.-J. Kim, S. Kim, Y. Yoon, and G. Yoo, "Label-Free and Recalibrated Multilayer MoS_2 Biosensor for Point-of-Care Diagnostics," *ACS Applied Materials & Interfaces*, vol. 9, no. 50, pp. 43490-43497 (2017). [†] Equal contributions.

[J26] **Y. Zhao***, **A. AlMutairi***, and Y. Yoon, "Assessment of Germanane Field-Effect Transistors for CMOS Technology," *IEEE Electron Device Letters*, vol. 38, no. 12, pp. 1743-1746 (2017).

[J27] **D. Yin***, **A. AlMutairi***, and Y. Yoon, "Assessment of High-Frequency Performance Limit of Black Phosphorus Field-Effect Transistors," *IEEE Transactions on Electron Devices*, vol. 64, no. 7, pp. 2984-2991 (2017).

[J28] **A. AlMutairi***, **Y. Zhao***, **D. Yin***, and Y. Yoon, "Performance Limit Projection of Germanane Field-Effect Transistors," *IEEE Electron Device Letters*, vol. 38, no. 5, pp. 673-676 (2017).

[J29] **H. Lee***, Y. Yoon, and C. Shin, "Current-Voltage Model for Negative Capacitance Field-Effect Transistors," *IEEE Electron Device Letters*, vol. 38, no. 5, pp. 669-672 (2017).

[J30] Y. K. Hong, N. Liu, **D. Yin***, S. Hong, D. H. Kim, S. Kim, W. Choi, and Y. Yoon, "Recent Progress in High-Mobility Thin-Film Transistors Based on Multilayer 2D Materials," *Journal of Physics D: Applied Physics*, vol. 50, no. 16, p. 164001 (17 pages) (2017).

[J31] **(Cover Article)** J. Baek[†], **D. Yin***[,†], N. Liu[†], I. Omkaram, C. Jung, H. Im, S.M. Kim, J. Hur, Y. Yoon, and S. Kim, "A Highly Sensitive Chemical Gas Detecting Transistor Based on Highly Crystalline CVD-Grown $MoSe_2$ Films," *Nano Research*, vol. 10, no. 6, pp. 1861–1871 (2017). [†]Equal contributions.

[J32] **D. Yin*** and Y. Yoon, "Design Strategy of 2D Material Field-Effect Transistors: Engineering the Number of Layers in Phosphorene FETs," *Journal of Applied Physics*, vol. 119, no. 21, p. 214312 (8 pages) (2016).

[J33] C. Jung, S. M. Kim, H. Moon, **G. Han***, J. Kwon, O. Kim, Y. K Hong, I. Omkaram, Y. Yoon, S. Kim, and J. Park, "Highly Crystalline CVD-grown Multilayer $MoSe_2$ Thin Film Transistor for Fast Photodetector," *Scientific Reports*, vol. 5, p. 15313 (9 pages) (2015).

[J34] **D. Yin***, **G. Han***, and Y. Yoon, "Scaling Limit of Bilayer Phosphorene FETs," *IEEE Electron Device Letters*, vol. 36, no. 9, pp. 978–980 (2015).

[J35] J. Kwon, S. Hong, Y. K. Hong, S. Lee, G. Yoo, Y. Yoon, S. Kim, "Photosensitivity Enhancement in Hydrogenated Amorphous Silicon Thin-Film Phototransistors with Gate Underlap," *Applied Physics Letters*, vol. 107, no. 20, p. 201103 (4 pages) (2015).

[J36] **(Cover Article)** J. Kwon[†], Y. K. Hong[†], **G. Han***[,†], I. Omkaram, W. Choi, S. Kim, and Y. Yoon, "Giant Photoamplification in Indirect-Bandgap Multilayer MoS_2 Phototransistors with Local Bottom-Gate Structures," *Advanced Materials*, vol. 27, no. 13, pp. 2224–2230 (2015). [†] Equal contributions.

[J37] **G. Han*** and Y. Yoon, "Contact-Dependent Performance Variability of Monolayer MoS_2 Field-Effect Transistors," *Applied Physics Letters*, vol. 105, no. 21, p. 213508 (5 pages) (2014).

[J38] K. Ganapathi, Y. Yoon, M. Lundstrom, and S. Salahuddin, "Ballistic I–V Characteristics of Short-Channel Graphene Field-Effect Transistors: Analysis and Optimization for Analog and RF Applications," *IEEE Transactions on Electron Devices*, vol. 60, no. 3, pp. 958-964 (2013).

[J39] **(Cover Article)** Y. Yoon and S. Salahuddin, "Dissipative Transport in Rough Edge Graphene Nanoribbon Tunnel Transistors," *Applied Physics Letters*, vol. 101, no. 26, p. 263501 (4 pages) (2012).

[J40] Y. Yoon, K. Ganapathi, and S. Salahuddin, "How Good Can Monolayer MoS_2 Transistors Be?," *Nano Letters*, vol. 11, no. 9, pp. 3768-3773 (2011).

[J41] Y. Yoon, D. E. Nikonov, and S. Salahuddin, "Role of Phonon Scattering in Graphene Nanoribbon Transistors: Nonequilibrium Green's Function Method with Real Space Approach," *Applied Physics Letters*, vol. 98, no. 20, p. 203503 (3 pages) (2011).

[J42] M. Choudhury, Y. Yoon, J. Guo, and K. Mohanram, "Graphene Nanoribbon FETs: Technology Exploration for Performance and Reliability," *IEEE Transactions on Nanotechnology*, vol. 10, no. 4, pp. 727-736 (2011).

[J43] **(Editors' Picks) (Cover Article)** Y. Yoon and S. Salahuddin, "Barrier-Free Tunneling in a Carbon Heterojunction Transistor," *Applied Physics Letters*, vol. 97, no. 3, p. 033102 (3 pages) (2010).

[J44] Y. Yoon, S. H. Kim, and S. Salahuddin, "Performance Analysis of Carbon-Based Tunnel Field-Effect Transistors for High Frequency and Ultralow Power Applications," *Applied Physics Letters*, vol. 97, no. 23, p. 233504 (3 pages) (2010).

[J45] K. Ganapathi, Y. Yoon, and S. Salahuddin, "Analysis of InAs Vertical and Lateral Band-to-Band Tunneling Transistors: Leveraging Vertical Tunneling for Improved Performance," *Applied Physics Letters*, vol. 97, no. 3, p. 033504 (3 pages) (2010).

[J46] Y. Yoon and S. Salahuddin, "Inverse Temperature Dependence of Subthreshold Slope in Graphene Nanoribbon Tunneling Transistors," *Applied Physics Letters*, vol. 96, no. 1, p. 013510 (3 pages) (2010).

[J47] X. Wang, X. Li, L. Zhang, Y. Yoon, P. Weber, H. Wang, J. Guo, and H. Dai, "N-Doping of Graphene through Electrothermal Reactions with Ammonia," *Science*, vol. 324, no. 5928, pp. 768-771 (2009).

[J48] B. Liu, M. McCarthy, Y. Yoon, D. Kim, F. So, P. Holloway, J. R. Reynolds, J. Guo, and A. G. Rinzler, "Carbon Nanotube Enabled Vertical Field Effect and Light Emitting Transistors," *Advanced Materials*, vol. 20, no. 19, pp. 3605-3609 (2008).

[J49] Y. Yoon, G. Fiori, S. Hong, G. Iannaccone, and J. Guo, "Performance Comparison of Graphene Nanoribbon FETs with Schottky Contacts and Doped Reservoirs," *IEEE Transactions on Electron Devices*, vol. 55, no. 9, pp. 2314-2323 (2008).

[J50] S. Hong, Y. Yoon, and J. Guo, "Metal-Semiconductor Junction of Graphene Nanoribbons," *Applied Physics Letters*, vol. 92, no. 8, p. 083107 (3 pages) (2008).

[J51] Y. Yoon, J. Fodor, and J. Guo, "A Computational Study of Vertical Partial-Gate Carbon-Nanotube FETs," *IEEE Transactions on Electron Devices*, vol. 55, no. 1, pp. 283-288 (2008).

[J52] Y. Yoon and J. Guo, "Effect of Edge Roughness in Graphene Nanoribbon Transistors," *Applied Physics Letters*, vol. 91, no. 7, p. 073103 (3 pages) (2007).

[J53] Y. Ouyang, Y. Yoon, and J. Guo, "Scaling Behaviors of Graphene Nanoribbon FETs: A Three-Dimensional Quantum Simulation Study," *IEEE Transactions on Electron Devices*, vol. 54, no. 9, pp. 2223-2231 (2007).

[J54] J. Guo, Y. Yoon, and Y. Ouyang, "Gate Electrostatics and Quantum Capacitance of Graphene Nanoribbons," *Nano Letters*, vol. 7, no. 7, pp. 1935-1940 (2007).

[J55] Y. Yoon and J. Guo, "Analysis of Strain Effects in Ballistic Carbon Nanotube FETs," *IEEE Transactions on Electron Devices*, vol. 54, no. 6, pp. 1280-1287 (2007).

[J56] Y. Yoon, J. Lin, S. Pearton, and J. Guo, "Role of Grain Boundaries in ZnO Nanowire Transistors," *Journal of Applied Physics*, vol. 101, no. 2, p. 024301 (5 pages) (2007).

[J57] Y. Ouyang, Y. Yoon, and J. Guo, "On the Current Delivery Limit of Semiconducting Carbon Nanotubes," *Journal of Computer-Aided Materials Design*, vol. 14, no. 2, pp. 73-78 (2007).

[J58] Y. Ouyang, Y. Yoon, J. Fodor, and J. Guo, "Comparison of Performance Limits for Carbon Nanoribbon and Carbon Nanotube Transistors," *Applied Physics Letters*, vol. 89, no. 20, p. 203107 (3 pages) (2006).

[J59] Y. Yoon, Y. Ouyang, and J. Guo, "Effect of Phonon Scattering on Intrinsic Delay and Cutoff Frequency of CNTFETs," *IEEE Transactions on Electron Devices*, vol. 53, no. 10, pp. 2467-2470 (2006).

[J60] J. Guo, M. A. Alam, and Y. Yoon, "Theoretical Investigation on Photoconductivity of Single Intrinsic Carbon Nanotubes," *Applied Physics Letters*, vol. 88, no. 13, p. 133111 (3 pages) (2006).

2. Articles in Refereed Conference Proceedings

[C1] **Y. Zhao***, Y. Yoon, and L. Wei, "A Multi-Level Simulation of GeH FETs: From Nanomaterial and Device Characteristics to Circuit Performance Optimization," *ACM International Symposium on Nanoscale Architectures (NanoArch)*, Virtual, Dec. 7-9, 2022.

[C2] **M. Sritharan*** and Y. Yoon, "High-k Compatible 2D-Material Electronics for Display Devices," *International Meeting on Information Display (IMID)*, E13-3, Busan, Korea, Aug. 23-26, 2022.

[C3] **Y. Zhao***, Y. Yoon, and L. Wei, "A Multi-Level Simulation Scheme for 2D Material-Based Nanoelectronics," *IEEE International Conference on Nanotechnology (IEEE-NANO)*, pp. 388-392, Montreal, QC, Canada, July 29-31, 2020.

[C4] **G. Radhakrishnan***, Y. Yoon, and M. Sachdev, "Accelerating STT-MRAM Ramp-up Characterization," *IEEE International New Circuits and Systems Conference (NEWCAS)*, pp. 303-306, Montreal, QC, Canada, June 16-19, 2020.

[C5] Y. Yoon and S. Kim, "2D Materials for Switching Applications and Highly Responsive Phototransistors," *International Meeting on Information Display (IMID)*, P03-95, Gyeongju, Korea, Aug. 27-30, 2019.

[C6] **D. Yin*** and Y. Yoon, "Can Bilayer Black Phosphorus Outperform Monolayer in Field-Effect Transistors?," *Device Research Conference (DRC)*, pp. 177-178, Columbus, OH, USA, Jun. 21-24, 2015.

[C7] **G. Han*** and Y. Yoon, "Contact-Dependent Susceptibility and Immunity to Short-Channel Effects in Monolayer MoS_2 Field-Effect Transistors," *IEEE International Conference on Nanotechnology (IEEE-NANO)*, pp. 620-623, Toronto, ON, Canada, Aug. 18-21, 2014.

[C8] Y. Yoon, D. E. Nikonov, and S. Salahuddin, "Scaling Study of Graphene Transistors," *IEEE International Conference on Nanotechnology (IEEE-NANO)*, pp. 1568-1571, Portland, OR, USA, Aug. 15-18, 2011.

[C9] K. Ganapathi, Y. Yoon, and S. Salahuddin, "Monolayer MoS_2 Transistors – Ballistic Performance Limit Analysis," *Device Research Conference (DRC)*, pp. 79-80, Santa Barbara, CA, USA, Jun. 20-22, 2011.

[C10] Y. Yoon and S. Salahuddin, "Performance Assessment of Partially Unzipped Carbon Nanotube Field-Effect Transistors," *IEEE / ACM International Symposium on Nanoscale Architectures (NanoArch)*, pp. 157-161, San Diego, CA, USA, Jun. 8-9, 2011.

[C11] Y. Yoon and S. Salahuddin, "Simulation of Carbon Heterostructures as Barrier Free Tunneling Transistors," *ECS Transactions*, vol. 35, no. 3, pp. 253-258, *ECS Meeting*, Montreal, QC, Canada, May 1-6, 2011.

[C12] K. Ganapathi, Y. Yoon, and S. Salahuddin, "Comparative Analysis of the Performance of InAs Lateral and Vertical Band-to-Band Tunneling Transistors," *Device Research Conference (DRC)*, pp. 57-58, Notre Dame, IN, USA, Jun. 21-23, 2010.

[C13] Y. Yoon and S. Salahuddin, "Structure and Doping Effects in Carbon Heterojunction FETs towards Barrier-Free Inter-Band Tunneling," *Device Research Conference (DRC)*, pp. 215-216, Notre Dame, IN, USA, Jun. 21-23, 2010.

[C14] Y. Ouyang, Y. Yoon, and J. Guo, "Edge Chemistry Engineering of Graphene Nanoribbon Transistors: A Computational Study," *International Electron Devices Meeting (IEDM) Tech. Dig.* pp. 517-520, San Francisco, CA, USA, Dec. 15-17, 2008.

[C15] M. Choudhury, Y. Yoon, J. Guo, and K. Mohanram, "Technology Exploration for Graphene Nanoribbon FETs," *Design Automation Conference (DAC)*, pp. 272-277, Anaheim, CA, USA, Jun. 8-13, 2008.

[C16] G. Fiori, Y. Yoon, S. Hong, G. Iannaccone, and J. Guo, "Performance Comparison of Graphene Nanoribbon Schottky Barrier and MOS FETs," *International Electron Devices Meeting (IEDM) Tech. Dig.* pp.757-760, Washington, DC, USA, Dec. 10-12, 2007.

[C17] Y. Yoon, Y. Ouyang, and J. Guo, "Scaling Behaviors of Graphene Nanoribbon FETs," *Device Research Conference (DRC)*, pp. 271-272, South Bend, IN, USA, Jun. 18-20, 2007.

[C18] Y. Yoon, Y. Ouyang, M. A. Alam, and J. Guo, "A Computational Study of Carbon Nanotube Optoelectronic Devices," *Proceedings of SPIE*, vol. 6370, p. 63700G (12 pages), *Optics East*, Boston, MA, USA, Oct. 1-4, 2006.

3. Conference Abstracts

[A1] **G. Radhakrishnan***, Y. Yoon, and M. Sachdev, "A DFT Scheme for Fault Monitoring in STT-MRAMs," *International Test Conference*, Washington DC, USA, Nov. 12-14, 2019.

[A2] S. Kim and Y. Yoon, "High Responsivity and Wide Spectral Response of 2D Layered Optoelectronic Devices," *International Conference on Amorphous and Nanocrystalline Semiconductors (ICANS)*, Seoul, Korea, Aug. 21-25, 2017.

[A3] **G. Han***, **D. Yin***, and Y. Yoon, "Numerical Device Simulations for $MoSe_2$ Field-Effect Transistors: Effective Mass vs. Tight-Binding Approximations," *Canadian Semiconductor Science and Technology Conference (CSSTC)*, Waterloo, ON, Canada, Aug. 20-24, 2017.

[A4] S. Hong, O. J. Kim, **G. Han***, J. Kwon, N. Liu, Y. K. Hong, I. Omkaram, Y. Yoon, S. Kim, "High Photoresponsivity Multilayer MoS_2 Thin-Film Transistors with Local Bottom Gate Structure," *PRiME/ECS Meeting*, Honolulu, HI, USA, Oct. 2-7, 2016.

[A5] **D. Yin*** and Y. Yoon, "Black Phosphorus: New Opportunities in Electronic Device Applications," *ECS Meeting*, San Diego, CA, USA, May 29-Jun. 2, 2016.

[A6] J. Kwon, Y. K. Hong, **G. Han***, O. Inturu, S. Park, W. Choi, Y. Yoon, and S. Kim, "Giant Photo-Amplification in 2D Multilayer MoS_2 Phototransistors," *Materials Research Society (MRS) Spring Meeting & Exhibit*, San Francisco, CA, USA, Apr. 6-10, 2015.

[A7] Y. Yoon and S. Salahuddin, "Role of Optical Phonon in Graphene Nanoribbon Tunnel Transistors: Strategy for Abrupt Switching from Material's Point of View," *Electronic Materials Conference (EMC)*, Santa Barbara, CA, USA, Jun. 22-24, 2011.

[A8] Y. Yoon and S. Salahuddin, "Carbon-Based Zero-Bandgap Tunnel Transistors," *American Physical Society (APS) March Meeting*, Dallas, TX, USA, Mar. 21-25, 2011.

[A9] Y. Yoon and S. Salahuddin, "Non-linear Temperature Dependence of Subthreshold Current in Tunneling FETs Based on Graphene Nanoribbon," *Materials Research Society (MRS) Spring Meeting*, San Francisco, CA, USA, Apr. 5-9, 2010.

[A10] Y. Yoon and S. Salahuddin, "Temperature-Dependent Subthreshold Characteristics in Graphene Nanoribbon Tunneling Transistors," *American Physical Society (APS) March Meeting*, Portland, OR, USA, Mar. 15-19, 2010.

[A11] Y. Yoon, G. Fiori, G. Iannaccone, and J. Guo, "Atomistic Simulation of Graphene Nanoribbon FETs for Performance, Variability, and Defects," *Techcon*, Austin, TX, USA, Nov. 3-4, 2008.

[A12] Y. Yoon, G. Fiori, S. Hong, G. Iannaccone, and J. Guo, "Effect of Disorders in Graphene Nanoribbon Field-Effect Transistors," *American Physical Society (APS) March Meeting*, New Orleans, LA, USA, Mar. 10-14, 2008.

[A13] B. Liu, M. McCarthy, Y. Yoon, D. Kim, Z. Wu, F. So, P. Holloway, J. R. Reynolds, J. Guo, and A. G. Rinzler, "Nanotube Enabled Thin Film Transistors Utilizing Low Mobility Organic Semiconductors," *American Physical Society (APS) March Meeting*, New Orleans, LA, USA, Mar. 10-14, 2008.

[A14] Y. Ouyang, Y. Yoon, J. Guo, "Current Delivery Capacity of Semiconducting Carbon Nanotubes," *American Physical Society (APS) March Meeting*, Baltimore, MD, USA, Mar. 13-17, 2006.

TALKS & SEMINARS

1. Invited Talks

[T1] **M. Sritharan***, **H. Lee***, and Y. Yoon, "Harnessing the Promise of Nanomaterials for Future Electronic Devices," *IEEE NEMS*, Jeju, Korea, May 14-17, 2023.

[T2] Y. Yoon, "Multi-Level Simulations: From Materials to Devices and Circuits," *Workshop in Quantum Materials and Devices*, Waterloo, ON, Canada, Feb. 17, 2021.

[T3] Y. Yoon and S. Kim, "2D Materials: New Opportunities for Electronic and Optoelectronic Devices," *International Union of Materials Research Societies–International Conference on Electronic Materials (IUMRS-ICEM)*, Daejeon, Korea, Aug. 19-24, 2018.

[T4] Y. Yoon, "2D Materials: New Opportunities for Electronic and Optoelectric Devices," *KIST*, Seoul, Korea, Aug. 14, 2018.

[T5] Y. Yoon, "2D Materials: New Opportunities for Electronic and Optoelectric Devices," *Kookmin University*, Seoul, Korea, Aug. 13, 2018.

[T6] Y. Yoon, "Switching Devices and Phototransistors Based on Transition Metal Dichalcogenides," *UNIST*, Ulsan, Korea, Aug. 9, 2018.

[T7] Y. Yoon, "Modeling, Analysis, and Optimization of Nanoelectronic Devices," *AKCSE Seminar*, Toronto, ON, Canada, Dec. 9, 2017.

[T8] **G. Han*** and Y. Yoon, "Considerations of 2D Materials for Electronic Device Applications," *Asian-European Conference on Plasma Surface Engineering (AEPSE)*, Jeju, Korea, Sep. 11-16, 2017.

[T9] Y. Yoon, "2D Materials: New Opportunities in Electronic Device Applications," *KAIST*, Daejeon, Korea, Sep. 14, 2017.

[T10] Y. Yoon, "2D Materials: New Opportunities in Electronic Device Applications," *University of Seoul*, Seoul, Korea, Sep. 11, 2017.

[T11] **G. Han***, **A. AlMutairi***, **Y. Zhao***, **D. Yin***, and Y. Yoon, "Recent Progress in Numerical Simulations for 2D-Material Device Applications," *International Meeting on Information Display (IMID)*, Busan, Korea, Aug. 28-31, 2017.

[T12] Y. Yoon, "Opportunities of 2D Materials in Electronics and Optoelectronics," Dalhousie University, Halifax, NS, Canada, Oct. 12, 2016.

[T13] Y. Yoon, "Modeling and Simulations for Quantum Transport," *Workshop on Modeling and Simulation for Experimental Research*, Waterloo, ON, Canada, May 27, 2016.

[T14] Y. Yoon, "Quantum Transport in 2D-Material Field-Effect Transistors," Kyung Hee University, Yongin, Korea, Aug. 24, 2015.

[T15] **D. Yin***, **G. Han***, and Y. Yoon, "Simulation Study of Electrical and Optical Properties of 2D-Material FETs," *International Meeting on Information Display (IMID)*, Daegu, Korea, Aug. 18-21, 2015.

[T16] Y. Yoon, "Quantum Transport in 2D-Material Field-Effect Transistors," UNIST, Ulsan, Korea, Aug. 17, 2015.

[T17] Y. Yoon, "Layered Materials for Future Electronics: From Engineer's Viewpoint," McGill University, Montreal, QC, Canada, Nov. 14, 2013.

[T18] Y. Yoon, "Coulomb Blockade and Single Electron Transistors," University of Waterloo, Waterloo, ON, Canada, Nov. 9, 2012.

[T19] Y. Yoon, "Opportunities and Challenges of 2-D Materials for Future Electronics," UNIST, Ulsan, Korea, Oct. 29, 2012.

[T20] Y. Yoon, "Computational Perspective in a Flat Land: New 2-D Materials for Next-Generation Electronics," University of Waterloo, Waterloo, ON, Canada, Sep. 18, 2012.

[T21] Y. Yoon, "2-D Materials and Electronic Applications," Korea Institute of Science and Technology (KIST), Seoul, Korea, Jun. 29, 2012.

[T22] Y. Yoon, "Opportunities and Challenges of 2-D Materials towards Electronics," Kyung Hee University, Yongin, Korea, Jun. 21, 2012.

2. Other Contributions to Presentation

[P1] **M. Sritharan***, **H. Lee*** and Y. Yoon, "Modelling and Simulation of Ferroelectric-based Negative Capacitance Devices," *TQT Quantum Opportunities and Showcase*, Waterloo, ON, Canada, Oct. 20, 2022.

[P2] **(Best Poster) M. Sritharan*** and Y. Yoon, "Emerging 2D Materials for Nanoscale Transistors: A Computational Perspective," *Nano Ontario*, Waterloo, ON, Canada, Oct. 11-12, 2022.

[P3] **M. Sritharan*** and Y. Yoon, "High-κ Compatible 2D Materials for Nanoscale Transistors," *Waterloo Nanotechnology Conference (WNC)*, Waterloo, ON, Canada, Mar. 26, 2022.

[P4] Y. Yoon, "2D Materials for Switching Applications and Highly Responsive Photosensors," *Canada-Korea Conference on Science and Technology (CKC)*, Banff, AB, Canada, Jun. 16-19, 2019.

[P5] Y. Yoon, "Energy-Efficient Negative Capacitance Electronics," *Canada-Korea Conference on Science and Technology (CKC)*, Banff, AB, Canada, Jun. 16-19, 2019.

[P6] **Y. Zhao***, **A. AlMutairi***, and Y. Yoon, "Quantum Transport in Nanotransistors," *ECE Open House on Quantum Science and Technology*, Waterloo, ON, Canada, Jul. 13, 2018.

[P7] Y. Yoon and **H. Lee***, "Negative Capacitance Field-Effect Transistors for Energy-Efficient Electronics," *Canada-Korea Conference on Science and Technology (CKC)*, Vancouver, BC, Canada, Jun. 17-20, 2018.

[P8] Y. Yoon, "Future Electronics: From a Theoretical Perspective," *Canada-Korea Conference on Science and Technology (CKC)*, Vancouver, BC, Canada, Jun. 17-20, 2018.

[P9] **G. Han***, **D. Yin***, and Y. Yoon, "Modeling and Simulation for Sensing Applications," *ECE Open House on Flexible Electronics, Displays and Sensing*, Waterloo, ON, Canada, May 8, 2018.

[P10] **A. AlMutairi***, **Y. Zhao***, and Y. Yoon, "Modeling and Simulation of Nanoelectronic Devices," *ECE Open House on Flexible Electronics, Displays and Sensing*, Waterloo, ON, Canada, May 8, 2018.

[P11] S. Kim and Y. Yoon, "Development of Biofeedback Systems for Monitoring Emergency," *Canada-Korea Conference on Science and Technology (CKC)*, Montreal, QC, Canada, Aug. 6-8, 2017.

[P12] Y. Yoon, "Modeling and Numerical Simulation of Electronic and Optoelectronic Devices Based on Novel 2D Layered Materials," *Canada-Korea Conference on Science and Technology (CKC)*, Kananaskis, AB, Canada, Jul. 26-28, 2015.

[P13] Y. Yoon, "Scaling of Graphene Nanoribbon Transistors: Impact of Phonons on Device Characteristics," *FENA E-Workshop*, Sep. 22, 2011.

[P14] Y. Yoon, "Carrier Transport in Graphene Nanoribbon Transistors," *Berkeley Nanosciences and Nanoengineering Institute (BNNI) Seminar*, Berkeley, CA, USA, Feb. 25, 2011.

[P15] Y. Yoon, "Electronic Transport in a Carbon Heterostructure," *FENA E-Workshop*, Apr. 1, 2010.

[P16] Y. Ouyang, Y. Yoon, and J. Guo, "On the Current Delivery Limit of Semiconducting CNTs," *Synergy Between Experiment and Computation in Nanoscale Science*, Boston, MA, USA, May 31 - Jun. 3, 2006.

SERVICES

1. Editorial Positions

- Guest Editor, *IEEE Transactions on Electron Devices* 2017 – 2018
  Special Issue on "2D Materials for Electronic, Optoelectronic and Sensor devices"
- Guest Editor, *Journal of Electrical and Computer Engineering* 2014
  Special Issue on "CMOS Extension Technology: Materials, Devices, and Circuits (CMOS)"

2. Technical Committee

- IEEE Electron Devices Society (EDS) Technical Committee (Nanotechnology) 2017 – 2021

3. Conference Program Committee

- International Workshop on Computational Nanotechnology (IWCN) 2021
- International Union of Materials Research Societies–International Conference on Electronic Materials (IUMRS-ICEM) 2018
  Topic on "2D Materials and Devices Beyond Graphene"
- International Meeting on Information Display (IMID) 2015
  Topic on "2D Materials for Display"