Inhee Lee

Assistant Professor
Department of Electrical and Computer Engineering, University of Pittsburgh
1128 Benedum Hall, 3700 O'Hara Street, Pittsburgh, PA 15261
Tel: 734-353-2416, Email: inl13@pitt.edu

RESEARCH INTERESTS

- Internet-of-tiny-things (IoT^2) system development (millimeter or sub-millimeter scale)
- Miniature sensor system development for biomedical, ecological, and industrial applications
- Low-power, energy-efficient analog/mixed-signal/digital circuit design
- Adaptive circuit design to tolerate environment and process variation
- Energy harvesting circuit, power/battery management circuit, sensor/sensor interface, voltage/current/timing reference

EDUCATION

- **Doctor of Philosophy** in Electrical Engineering, University of Michigan, Ann Arbor, Michigan
  December 2014
  Thesis: "Power Management Circuits for Miniature Sensor Systems"
  Advisor: Professor David Blaauw
- **Master of Science** in Electrical and Electronic Engineering, Yonsei University, Seoul, South Korea
  August 2008
  Thesis: "The Design of an Inverter-based Time-Interleaved Band-Pass Delta-Sigma Modulator for a Digital-IF Receiver"
  Advisor: Professor Gunhee Han
- **Bachelor of Science** in Electrical and Electronic Engineering, Yonsei University, Seoul, South Korea
  August 2006

PROFESSIONAL EXPERIENCE

- September 2019–Present
  Assistant Professor
  Electrical and Computer Engineering
  University of Pittsburgh, Pittsburgh, Pennsylvania
- November 2015–October 2019
  Assistant Research Scientist
  Electrical Engineering and Computer Science
  University of Michigan, Ann Arbor, Michigan
- November 2014–November 2015
  Research Fellow
  Electrical Engineering and Computer Science
  University of Michigan, Ann Arbor, Michigan

INVITED TALKS

1. MDPI 5th Electronics Webinar, “Millimeter-Scale Smart Sensing System,” Jul, 14, 2022.
2. University of Delaware, “Millimeter-Scale Smart Sensing System," Newark, DE, Oct, 2021.
3. University of Pittsburgh, "PITT Integrated Circuit Design Lab," Pittsburgh, PA, Feb. 2021.
4. Yonsei University, "Millimeter-Scale Smart Sensing System," Seoul, South Korea, Dec. 2020.
5. University of Pittsburgh, "Millimeter-Scale Smart Sensing System," Pittsburgh, PA, Sep. 2019.
6. North Carolina State University, "Smart Miniature Systems Leading the Next Generation of the IoT Era," Raleigh, NC, Mar. 2019.
7. Indiana University, "Smart Miniature Systems Leading the Next Generation of the IoT Era," Bloomington, IL, Mar. 2019.
8. University of Pittsburgh, "Smart Miniature Systems Leading the Next Generation of the IoT Era ," Pittsburgh, PA, Jan. 2019.
9. IBM, “The World’s Smallest Computer: Michigan Micro Mote,” Yorktown Heights, NY, Nov. 2018.
10. Samsung, “Miniature Sensing System and Low-power Circuit Design Technique,” Suwon, Korea, May 2018.
11. Pennsylvania State University, "Millimeter-Scale Nano-Watt Sensing System," University Park, PA, Mar. 2018.
12. Indiana University, "Miniature Intelligent Sensing System," Bloomington, IL, Mar. 2018.
13. SungKyunKwan University (SKKU), “Low-Power Energy Harvesting Techniques for Miniature IoT Systems,” Suwon, Korea, May 2016.
14. International Symposium on Quality Electronic Design (isQED), “Low-Power Circuit Techniques for IoT Energy Harvesting,” Santa Clara, CA, Mar. 2016.

HONORS & AWARDS

- Best Paper Award, MobiCom 2021, March 2022; **I. Lee***, R. Hsiao*, Gordy Carichner, C.-W. Hsu, M. Wang, S. Shoouri, K. Ernst, T. Carichner, Y. Li, J. Lim, C. R. Julick. E. Moon, Y. Sun, J. Phillips, K. L. Montooth, D. A. Green II, H.-S. Kim, and D. Blaauw “mSAIL: Milligram-Scale Multi-Modal Sensor Platform for Monarch Butterfly Migration Tracking” (* equally contributed)

- Winner, WIMS2 2015 IAB Poster Contest, University of Michigan, October 2015: W. Lim, **I. Lee**, D. Sylvester, and D. Blaauw, “Batteryless Sub-nW Cortex-M0+ Processor with Dynamic Leakage-Suppression Logic”

- Bronze Prize, Human-Tech Thesis Prize, Samsung Electronics, February 2014: Y. Kim, W. Jeong, and **I. Lee**, “A Static Contention-Free Single-phase-Clocked 24T Flip-Flop in 45nm for Low-Power Applications”

- Silver Prize, Human-Tech Thesis Prize, Samsung Electronics, February 2012: Y. Lee, **I. Lee**, Y. Kim, S. Bang, and G. Kim, “A Modular 1mm^3 Die-Stacked Sensing Platform”

- Best Student Poster Award, Multiscale Systems Center Annual Review, Multiscale Systems Center, November 2011: Y. Lee, G. Kim, S. Bang, Y. Kim, **I. Lee**, D. Sylvester, and D. Blaauw, “A Modular 1mm^3 Die-Stacked Sensing Platform”

- Bronze Prize, Semiconductor Chip Design Contest, Korea intellectual Property Office, November 2007: Y. Chae, **I. Lee**, and G. Han, "Low-Power Audio ΔΣ Analog-to-Digital Converter"
- Best New Student Scholarships, Yonsei University, South Korea, September 2006
- Highest Honors at Graduation, Yonsei University, South Korea, August 2006

TEACHING EXPERIENCE

• Fall 2019 Fall 2020 Fall 2021 Fall 2022	ECE 1192/2192 (Introduction to VLSI Design)	University of Pittsburgh
• Spring 2021	ECE 1195 (Analog Circuit Design)	University of Pittsburgh
• Spring 2023	ECE 1095/2095 (Analog Circuit Design)	
• Spring 2022 Summer 2022 Spring 2023	ECE 0102 (Microelectronic Circuits)	University of Pittsburgh
• Spring 2022	ECE 1896 (Senior Design)	University of Pittsburgh

PUBLICATIONS

A. BOOK CHAPTERS

B1. **I. Lee** and Y. Lee, "Circuit Design in mm-Scale Sensor Platform for Future IoT Applications," Chapter in Smart Sensors and Systems, C.-M. Kyung, H. Yasuura, Y. Liu, and Y.-L. Lin, editors, Springer Publishing Company, 2017.

B. JOURNAL ARTICLES

J1. H.-Y. Lee, C Lee, **I. Lee**, and Y. Chae, "A 0.033-mm2 21.5-to-119.4-aF Resolution Continuous-Time ΔΣ Capacitance-to-Digital Converter Achieving Parasitic Capacitance Immunity up to 480-pF," IEEE J. Solid-State Circuits (JSSC), vol. 57, no. 10, pp. 3048-3057, Oct. 2022. (Invited)

J2. Y. Li, Y. Wu, X. Zhang, J. Hu, and **I. Lee**, "Energy-Aware Adaptive Multi-Exit Neural Network Inference Implementation for a Millimeter-Scale Sensing System," IEEE Transactions on Very Large Scale Integration Systems (TVLSI), vol 30, no. 7, pp 849-859, July 2022.

J3. **I. Lee***, R. Hsiao*, Gordy Carichner, C.-W. Hsu, M. Wang, S. Shoouri, K. Ernst, T. Carichner, Y. Li, J. Lim, C. R. Julick. E. Moon, Y. Sun, J. Phillips, K. L. Montooth, D. A. Green II, H.-S. Kim, and D. Blaauw, "Tracking the Migration of the Monarch Butterflies with the World's Smallest Computer," GetMobile: Mobile Comp. and Comm., vol. 26, no. 1, Mar. 2022 (* equally contributed).

J4. E. A. Hamed*, J. Athas*, X. Zhang, N. Ashenden, and **I. Lee**, "A Low-Power GPIO-Based Size Sensor to Monitor the Imbibition of Corn Seeds Beneath Soil," MDPI Electronics, vol. 10, no. 19, Oct. 2021 (* equally contributed).

J5. Y. Li*, Y. Gao*, M. Shao, J. T. Tonecha, Y. Wu, J. Hu, and **I. Lee**, "Implementation of Multi-Exit Neural-Network Inferences for an Image-Based Sensing System with Energy Harvesting," MDPI Journal of Low Power Electronic Application (JLPEA), vol. 11, no. 3, Sep. 2021 (* equally contributed).

J6. E. A. Hamed and **I. Lee**, "Categorization and SEU Fault Simulations of Radiation-Hardened-by-Design Flip-Flops," MDPI Electronics, vol. 10, no. 13, June 2021.

J7. C. S. Bick*, **I. Lee***, D. Blaauw, T. Coote, A. E. Haponski, and D. Ó Foighil, "Surviving a Mass Extinction: mm-Sized Smart Sensors Reveal a Tree Snail's Solar Refuge," *Commun. Biol*. vol. 4, no. 1, June 2021 (* equally contributed).

J8. Y. Li*, Y. E. A. Hamed*, X. Zhang, D. Luna, J.-S. Lin, X. Liang, **I. Lee**, "Feasibility of Harvesting Solar Energy for Self-Powered Environmental Wireless Sensor Nodes," *MDPI Electronics*, vol. 9, no. 12, Dec. 2020. (* equally contributed).

J9. Y. Peng, K. D. Choo, S. Oh, **I. Lee**, T. Jang, Y. Kim, J. Lim, D. Blaauw, and D. Sylvester, "An Efficient Piezoelectric Energy Harvesting Interface Circuit Using a Sense-and-Set Rectifier," *IEEE J. Solid-State Circuits*, vol. 54, no. 12, pp. 3348-3361, Dec. 2019. (**Invited**).

J10. P. Bollella, **I. Lee**, D. Blaauw, and E. Katz, "A Microelectronic Sensor Device Powered by a Small Implantable Biofuel Cell," *ChemPhysChem*, Aug. 2019. (* equally contributed), (**Highlighted as a very important paper**).

J11. E. Moon, **I. Lee**, D. Blaauw, and J. Phillips, "High-Efficiency Photovoltaic Modules on a Chip for Millimeter-Scale Energy Harvesting," *Progress in Photovoltaics: Research and Applications*, vol 27, no. 6, pp 540-546, Mar. 2019.

J12. M. Gamella*, **I. Lee***, N. Guz, D. Blaauw, and E. Katz, "Bioelectronic Interface between Biomolecular Logic Systems and microelectronics," *International Journal of Unconvnetional Computing*, vol. 14, no. 1, pp 27-41, Jan. 2018. (* equally contributed).

J13. M. Choi, Y. Sui, **I. H. Lee**, Ryan Meredith, Y. Ma, G. Kim, D. Blaauw, Y. B. Gianchandani, and T. Li, "Autonomous Microsystems for Downhole Applications: Design Challenges, Current State, and initial Test Results," *Sensors*, vol. 17, Sep. 2017.

J14. **I. Lee**, S. Bang, Y. Kim, G. Kim, D. Sylvester, D. Blaauw, and Y. Lee, "A Wire-overhead-free Reset Propagation Scheme for Millimeter-scale Sensor Systems," *J. Semiconductor Technology and Science*, vol. 17, no. 4, pp 524-533, Aug. 2017.

J15. **I. Lee**, D. Sylvester, and D. Blaauw, "A Subthreshold Voltage Reference With Scalable Output Voltage for Low-Power IoT Systems," *IEEE J. Solid-State Circuits*, vol. 52, no. 5, pp. 1443-1449, May. 2017.

J16. X. Wu, Y. Shi, S. Jeloka, K. Yang, **I. Lee**, Y. Lee, D. Sylvester, and D. Blaauw, "A 20-pW Discontinuous Switched-Capacitor Energy Harvester for Smart Sensor Applications," *IEEE J. Solid-State Circuits*, vol. 52, no. 4, pp. 972-984, Apr. 2017 (**Invited**).

J17. **I. Lee**, Y-S Kuo, P. Pannuto, G. Kim, Z. Foo, B. Kempke, S. Jeong, Y. Kim, P. Dutta, D. Blaauw, and Y. Lee, "MBus: A Fully Synthesizable Low-power Portable Interconnect Bus for Millimeter-scale Sensor Systems," *J. Semiconductor Technology and Science*, vol. 16, no. 6, pp 745-753, Dec. 2016.

J18. **I. Lee**, Y. Lee, D. Sylvester, and D. Blaauw, "Battery Voltage Supervisors for Miniature IoT Systems," *IEEE J. Solid-State Circuits*, vol. 51, no. 11, pp. 2743-2756, Nov. 2016.

J19. S. Teran, E. Moon, W. Lim, G. Kim, **I. Lee**, D. Blaauw, and J. D. Phillips, "Energy Harvesting for GaAs Photovoltaics Under Low-Flux Indoor Lighting Conditions," *IEEE Tran. Electron Devices*, vol. 63, no 7, pp. 2820-2825, Jul. 2016.

J20. **I. Lee**, D. Sylvester, and D. Blaauw, "A Constant Energy-Per-Cycle Ring Oscillator Over a Wide Frequency Range for Wireless Sensor Nodes," *IEEE J. Solid-State Circuits*, vol. 51, no. 3, pp. 697-711, Mar. 2016.

J21. S. Jeong, **I. Lee**, D. Blaauw, and D. Sylvester, "A 5.8 nW CMOS Wake-Up Timer for Ultra-Low-Power Wireless Applications," *IEEE J. Solid-State Circuits*, vol. 50, no. 8, pp. 1754-1763, Aug. 2015 (**Invited**).

J22. **I. Lee**, G. Kim, S. Bang, A. Wolfe, R. Bell, S. Jeong, Y. Kim, J. Kagan, M. Arias-Thode, B. Chadwick, D. Sylvester, D. Blaauw, and Y. Lee, "System-on-Mud: Ultra-Low Power Oceanic Sensing Platform Powered by Small-Scale Benthic Microbial Fuel Cells," *IEEE Tran. Circuits Syst.* I, vol. 62, no. 4, pp 1126-1135, Apr. 2015.

J23. **I. Lee**, G. Han, and Y. Chae, "A 2mW, 50 dB DR, 10 MHz BW 5× Interleaved Bandpass Delta-Sigma Modulator at 50MHz IF," *IEEE Tran. Circuits Syst.* I, vol. 62, no. 1, pp. 80-89, Jan. 2015.

J24. Y. Chen, D. Jeon, Y. Lee, Y. Kim, Z. Foo, **I. Lee**, N. B. Langhals, G. Kruger, H. Oral, O. Berenfeld, Z. Zhang, D. Blaauw, and D. Sylvester, "An Injectable 64 nW ECG Mixed-Signal SoC in 65 nm for Arrhythmia Monitoring," *IEEE J. Solid-State Circuits*, vol. 50, no. 1, pp. 375-390, Jan. 2015 (**Invited**).

J25. Jeon, M. B. Henry, Y. Kim, **I. Lee**, Z. Zhang, D. Blaauw, D. Sylvester, "An Energy Efficient Full-Frame Feature Extraction Accelerator With Shift-Latch FIFO in 28 nm CMOS," *IEEE J. Solid-State Circuits*, vol. 49, no. 5, pp. 1271-1284, May 2014.

J26. M. H. Ghead, G. Chen, R. Haque, M. Wieckowski, Y. Kim, G. Kim, Y. Lee, **I. Lee**, D. Fick, D. Kim, M. Seok, K. D. Wise, D. Blaauw, and D. Sylvester, "Circuits for a Cubic-Millimeter Energy-Autonomous Wireless Intraocular Pressure Monitor," *IEEE Tran. Circuits Syst.* I, vol. 60, no. 12, pp. 3152-3162, Dec. 2013.

J27. Z. Foo, D. M Devescery, M. Hassan, **I. Lee**, A. Madhavan, Y. S. Park, A. S. Rao, Z. Renner, N. E. Roberts, A. D. Schulman, V. S. Vinay, M. Wieckowski, D. Yoon, C. Schmidt, T. Schmid, P. Dutta, P. M. Chen, and D. Blaauw, "A Low-Cost Audio Computer for Information Dissemination Among Illiterate People Groups," *IEEE Tran. Circuits Syst.* I, vol. 60, no. 8, pp. 2039-2050, Aug. 2013 (**Invited**).

J28. Y. Lee, S. Bang, **I. Lee**, Y. Kim, G. Kim, Mohammad G., Pat G, P. Dutta, D. Sylvester, and D. Blaauw, "A Modular 1 mm^3 Die-Stacked Sensing Platform With Low Power I^2C Inter-Die Communication and Multi-Modal Energy Harvesting," *IEEE J. Solid-State Circuits*, vol. 48, no. 1, pp. 229-243, Jan. 2013 (**Invited**).

J29. J. Cheon, Y. Chae, D. Kim, S. Lim, **I. Lee**, H.-K Lee, D J. Kim, and G. Han, "Smart CMOS Image Sensor With High SBR and Subpixel Resolution for Light-Section-Based Range Finding," *IEEE Trans. Electron Devices (T-ED)*, vol. 56, no. 11, pp. 2546-2555, Nov. 2009.

J30. J. Cheon, J. Lee, **I. Lee**, Y. Chae, Y. Yoo, and G. Han, "A Single-Chip CMOS Smoke and Temperature Sensor for an Intelligent Fire Detector," *IEEE Sensors journal* ,vol. 9, no. 8, pp.914-921, Aug. 2009.

C. CONFERENCE PAPERS

C1. D. Seo, M. Cho, M. Jeong, G. Shin, **I. Lee**, and Y. Lee, "A 0.24 mmHg (1σ) Resolution Half-Bridge-to-Digital Converter with RC Delay-Based Pressure Sensing and Energy-Efficient Bit-Level Oversampling Techniques for Implantable Miniature Systems," IEEE Asian Solid-State Circuits Conference (ASSCC), Nov. 2022.

C2. Y. Li and **I. Lee**, "A 36pW CMOS Voltage Reference With Independent TC and Output Level Calibration for Miniature Low-Power Systems," IEEE International Symposium on Circuit and Systems (ISCAS), June 2022.

C3. V. Pullela, A. Huluvallay, A. Jain, **I. Lee**, and Z. Abbas "A 156pW Gate-Leakage Based Voltage/Current Reference for Low-Power IoT Systems," IEEE International Symposium on Circuit and Systems (ISCAS), June 2022.

C4. **I. Lee***, R. Hsiao*, Gordy Carichner, C.-W. Hsu, M. Wang, S. Shoouri, K. Ernst, T. Carichner, Y. Li, J. Lim, C. R. Julick. E. Moon, Y. Sun, J. Phillips, K. L. Montooth, D. A. Green II, H.-S. Kim, and D. Blaauw, "mSAIL: Milligram-Scale Multi-Modal Sensor Platform for Monarch Butterfly Migration Tracking," ACM International Conference on Mobile Computing and Networking (MobiCom), Oct. 2021 (* equally contributed).

C5. S. Jeong, Y. Kim, Y. Li, and **I. Lee**, "A Millimeter-Scale Computing System with Adaptive Dynamic Load Power Tracking," IEEE Asian Solid-State Circuits Conference (ASSCC), Nov. 2021.

C6. Y. Li, E. Moon, J. Phillips, and **I. Lee**, "A Stacked-Photovoltaic-Cell Energy Harvester with >81% Indoor Light Harvesting Efficiency for Millimeter-Scale Energy-Autonomous Sensor Nodes," IEEE European Solid-State Circuits Conference (ESSCIRC), Sep. 2021.

C7. Y. Li, Y. Kim, E. Moon, J. Phillips, and **I. Lee**, "An Energy Autonomous Light Intensity Sensor for Monarch Butterfly Migration Tracking," IEEE European Solid-State Circuits Conference (ESSCIRC), Sep. 2021.

C8. Y. Li, Y. Wu, X. Zhang, E. Hamed, J. Hu, and **I. Lee**, "Developing a Miniature Energy-Harvesting-Powered Edge Device with Multi-Exit Neural Network," *IEEE International Symposium on Circuit and Systems (ISCAS)*, May 2021, accepted.

C9. Y. Li and **I. Lee**, "An 111pW Voltage Reference with a Diode-Leakage-Decoupling Replica for High-Temperature Miniature IoT Systems," *IEEE Custom Integrated Circuits Conference (CICC)*, Apr. 2021.

C10. M. Yang, R. Hsiao, G. Carichner, K. Ernst, J. Lim, D. A. Green II, **I. Lee**, D. Blaauw, and H.-S. Kim, "Migrating Monarch Butterfly Localization Using Multi-Modal Sensor Fusion Neural Networks," *European Signal Processing Conference (EUSIPCO)*, Jan. 2021.

C11. J. Lim, E. Moon, M. Barrow, S. R. Nason, P. R. Patel, P. G. Patil, S. Oh, **I. Lee**, H.-S. Kim, D. Sylvester, D. Blaauw, C. A. Shestek, J. Phillips, T. Jang, "A 0.19×0.17mm2 Wireless Neural Recording IC for Motor Prediction with Near-Infrared-Based Power and Data Telemetry," *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2020.

C12. T. Kang, **I. Lee**, S. Oh, S, T. Jang, Y. Kim, H. Ahn, G. Kim, S.-U. Shin, S. Jeong, D. Sylvester, D. Blaauw, "A 1.7×4.1×2 mm3 Fully Integrated pH Sensor for Implantable Applications using Differential Sensing and Drift-Compensation," *IEEE Symposium on VLSI Circuits (SOVC)*, Jun. 2019.

C13. **I. Lee**, and D. Blaauw, "A 31 pW-to-113 nW Hybrid BJT and CMOS Voltage Reference with 3.6% 3 sigma inaccuracy from 0 ^{o}C to 170 ^{o}C for Low-Power High-Temperature Systems," *IEEE Symposium on VLSI Circuits (SOVC)*, Jun. 2019.

C14. **I. Lee**, E. Moon, Y. Kim, J. Phillips, and D. Blaauw, "A 10mm^3 Light-Dose Sensing IoT^2 System with 35-to-339nW 10-to-300klx Light-Dose-to-Digital Converter," *IEEE Symposium on VLSI Circuits (SOVC)*, Jun. 2019.

C15. Y. Peng, D. Choo, S. Oh, **I. Lee**, T. Jang, Y. Kim. J. Lim, D. Sylvester, and D. Blaauw, "An Adiabatic Sense and Set Rectifier for Improved Maximum Power Point Tracking in Piezoelectric Harvesting with 541% Energy Extraction Gain," *IEEE International Solid-State Circuits Conference (ISSCC),* Feb. 2019.

C16. **I. Lee**, G. Kim, E. Moon, S. Jeong, D. Kim, J. Phillips, and D. Blaauw," A 179lux Energy-Autonomous Fully-Encapsulated 17mm^3 Sensor Node with Initial Charge Delay Circuit for Battery Protection," *IEEE Symposium on VLSI Circuits (SOVC)*, Jun. 2018.

C17. X. Wu, **I. Lee**, Q. Dong, K. Yang, D. Kim, J. Wang, Y. Chen, Y. Zhang, M. Saligane, T. Ema, R. Nanjo, A. Harada, M. Yasuda, K. Kumeno, S. Miyoshi, M. Kawaminami, D. Sylvester, and D. Blaauw, "A 0.04mm^3 16nW Wireless and Batteryless Sensor System with Integrated Cortex-M0+ Processor and Optical Communication for Intra-celluar Temperature Measurement," *IEEE Symposium on VLSI Circuits (SOVC)*, Jun. 2018.

C18. **I. Lee**, D. Sylvester, and D. Blaauw, "Subthreshold Voltage Reference With Nwell/Psub Diode Leakage Compensation for Low-Power High-Temperature Systems," *IEEE Asian Solid-State Circuits Conference (ASSCC)*, Nov. 2017.

C19. Q. Dong, **I. Lee**, K. Yang, D. Blaauw, and D. Sylvester, "A 1.02nW PMOS-only, Trim-Free Current Reference with 282ppm/^{o}C from -40^{o}C to 120^{o}C and 1.6% within-Wafer Inaccuracy," *IEEE European Solid-State Circuits Conference (ESSCIRC)*, Sep. 2017.

C20. M. Cho, S. Oh, S. Jeong, Y. Zhang, **I. Lee**, Y. Kim, L.-X. Chuo, D. Kim, Q. Dong, Y.-P. Chen, M. Lim, M. Daneman, D. Blaauw, D. Sylvester, and H.-S. Kim, "A 6×5×4mm3 general purpose audio sensor node with a 4.7μW audio processing IC," *IEEE Symposium on VLSI Circuits (SOVC)*, June, 2017.

C21. Q. Dong, Y. Kim, **I. Lee**, M. Choi, Z. Li, J. Wang, K. Yang, Y-P. Chen, J. Dong, M. Cho, G. Kim, W-K. Chang, Y-S. Chen, Y-D. Chih, D. Blaauw, and D. Sylvester, "A 1Mb Embedded NOR Flash Memory with 39μW Program Power for mm-Scale High-Temperature Sensor Nodes," *IEEE International Solid-State Circuits Conference (ISSCC),* Feb. 2017.

C22. X. Wu, Y. Shi, S. Jeloka, K. Yang, **I. Lee**, D. Sylvester, and D. Blaauw, "A 66pW discontinuous switch-capacitor energy harvester for self-sustaining sensor applications," *IEEE Symposium on VLSI Circuits (SOVC)*, June, 2016.

C23. W. Lim, T. Jang, **I. Lee**, H.-S. Kim, D. Sylvester, and D. Blaauw, "A 380pW dual mode optical wake-up receiver with ambient noise cancellation," *IEEE Symposium on VLSI Circuits (SOVC)*, June 2016.

C24. T. Jang, M. Choi, Y. Shi, **I. Lee**, D. Sylvester, and D. Blaauw, "Millimeter-scale computing platform for next generation of Internet of Things," *IEEE Int. Conf. RFID*, May. 2016.

C25. **I. Lee**, W. Lim, A. Teran, J. Phillips, D. Sylvester, and D. Blaauw, "A >78%-Efficient Light harvester over 100-to-100klux with Reconfigurable PV-Cell Network and MPPT Circuit," *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2016, pp. 370-371.

C26. **I. Lee**, W. Jung, H. Ha, S. Jeong, Y. Kim, G. Kim, Z. Foo, J.-Y. Sim, D. Sylvester, and D. Blaauw, "An Ultra-Low-Power Biomedical Chip for Injectable Pressure Monitor," *IEEE Biomedical Circuits and Systems Conference (BIOCAS)* (**Invited**), Oct. 2015.

C27. S. Bang, J.-S. Seo, **I. Lee**, S. Jeong, N. Pinckney, D. Blaauw, D. Sylvester, and L. Chang, "A Fully-Integrated 40-Phase Flying-Capacitance-Dithered Switched-Capacitor Voltage Regulator with 6mV Output Ripple," *IEEE Symposium on VLSI Circuits (SOVC)*, June 2015.

C28. W. Lim, **I. Lee**, D. Sylvester, and D. Blaauw, "Batteryless Sub-nW Cortex-M0+ Processor with Dynamic Leakage-Suppression Logic," *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2015.

C29. M. Choi, **I. Lee**, T.-K. Jang, D. Blaauw, and D. Sylvester, "A 23pW 780ppm/°C Resistor-Less Current Reference Using Subthreshold MOSFETs," *IEEE European Solid-State Circuits Conference (ESSCIRC)*, Sep. 2014.

C30. Y.-S. Kuo, P. Pannuto, G. Kim, Z. Foo, **I. Lee**, B. Kempke, P. Dutta, D. Blaauw, and Y. Lee, "MBus: A 17.5 pJ/bit/chip Portable Interconnect Bus for Millimeter-Scale Sensor Systems with 8 nW Standby Power," *IEEE Custom Integrated Circuits Conference (CICC)*, Sep. 2014.

C31. S. Jeong, **I. Lee**, D. Blaauw, and D. Sylvester, "A 5.8nW, 45ppm/°C On-Chip CMOS Wake-up Timer Using a Constant Charge Subtraction Scheme" *IEEE Custom Integrated Circuits Conference (CICC)*, Sep. 2014.

C32. **I. Lee**, Y. Kim, S. Bang, G. Kim, H. Ha, Y.-P. Chen, D. Jeon, S. Jeong, W. Jung, M. Ghaed, Z. Foo, Y. Lee, J.-Y. Sim, D. Sylvester, and D. Blaauw, "Circuit Techniques for Miniaturized Biomedical Sensors," *IEEE Custom Integrated Circuits Conference (CICC)*, Sep. 2014 (**Invited**).

C33. **I. Lee**, Y. Lee, D. Sylvester, and D. Blaauw, "Low Power Battery Supervisory Circuit with Adaptive Battery Health Monitor," *IEEE Symposium on VLSI Circuits (SOVC)*, June, 2014, pp. C17-C18 (**Selected as *Symposium Technical Highlight***).

C34. D. Blaauw, D. Sylvester, P. Dutta, Y. Lee, **I. Lee**, S. Bang, Y. Kim, G. Kim, P. Pannuto, Y.-S Kuo, D. Yoon, W. Jung, Z. Foo, Y.-P. Chen, S. Oh, S. Jeong, M. Choi, "IoT Design Space Challenges: Circuits and Systems," *IEEE Symposium on VLSI Technology (SOVT)*, June, 2014 (**Invited**).

C35. G. Kim, Y. Lee, Z. Foo, P. Pannuto, Y.-S. Kuo, B. Kempke, M. Ghaed, S. Bang, **I. Lee**, Y. Kim, S. Jeong, P. Dutta, D. Sylvester, and D. Blaauw, "A Millimeter-Scale Wireless Imaging System with Continuous Motion Detection and Energy Harvesting," *IEEE Symposium on VLSI Circuits (SOVC)*, June, 2014, pp. C141-C142.

C36. G. Kim, A. Wolfe, R. Bell, S. Bang, Y. Lee, **I. Lee**, Y. Kim, L. Hsu, J. Kagan, M. Arias-Thode, B. Chadwick, D. Sylvester, and D. Blaauw, "Chip-On-Mud: Ultra-Low Power ARM-Based Oceanic Sensing System Powered by Small-Scale Benthic Microbial Fuel Cells," *IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2014.

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