

# Mingoo Seok

Assistant Professor

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## Professional Experience

- **Columbia University at the City of New York** New York, NY  
*Assistant Professor* *Jan.2012 - present*
  - Department of Electrical Engineering
- **Systems and Applications R&D Center, Texas Instruments** Dallas, TX  
*Member of Technical Staff* *Jan.2011 - Nov.2011*
  - Signal processing VLSI design department
- **Design Automation Lab, EECS, University of Michigan** Ann Arbor, US  
*Research Assistant* *Jan.2006 - Dec.2010*
  - Investigate ultra-low power CMOS integrated circuit and system designs

## Educations

- **University of Michigan** Ann Arbor, MI, US  
*MS and Ph.D. in Electrical Engineering* *Sep. 2005 - Dec. 2010*
  - Advisor: Dennis Sylvester (co-advised by David Blaauw)
  - Thesis title: *Extreme Power-Constrained IC Design*
- **Seoul National University** Seoul, South Korea  
*Bachelor of Science in Electrical Engineering* *Mar. 1998 - Aug. 2005*
  - *summa cum laude*
- **Seoul Science High School** Seoul, South Korea  
*School for gifted students in science and mathematics* *Mar. 1995 - Feb. 1998*
  - *summa cum laude*

## Research Interest

- Variation, thermal, aging, and energy adaptive circuits, architecture, and self-testing frameworks
- Ultra-low-energy hardware design for biomedical devices, brain-machine-interface, wearable electronics, and Internet of Things
- Non-conventional hardware design; hybrid-analog-and-digital computing and event-driven computing
- Machine-learning algorithm and hardware design based on data-mining and neuromorphic approaches

## Honors and Awards

- **Wei Family Private Foundation Scholarship**, awarded for Zhewei Jiang's PhD study in Seok's research group, 2015
- **NSF CAREER Award**, 2015
- **AMD/CICC Student Scholarship Award** - Awarded for "A 0.5V 2.2pW 2-Transistor Voltage Reference", US, Aug. 2009

- **DAC/ISSCC Student Design Contest** - Awarded for "Phoenix: an Ultra-Low Power Processor for Cubic Millimeter Sensor Systems", US, Feb. 2009
- **Rackham Pre-doctoral Fellowship** - One of three recipients in the EECS department, University of Michigan, Ann Arbor, US, Sep.2008-Aug. 2009
- **Doctoral Study Abroad Fellowship** - One of 15 recipients, nationally, Korea Foundation for Advanced Studies, South Korea, Sep.2005-Aug. 2007
- **Excellency Fellowship** - Seoul National University, South Korea, Mar.1998-Mar.2001
- **Distinguished Undergraduate Scholarship** - One of 20 recipients, nationally, Korea Foundation for Advanced Studies, South Korea, Sep. 1999 - Feb. 2002

## Professional Services

- Journal Editors
  - Associate Editor - IEEE Transactions on Circuits and Systems I: Regular Papers, 2014-present
  - Associate Editor - IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 2015-present
- Technical Society Services
  - Treasure, IEEE New York Section EDS/SSCS Chapter, 2016-present
  - Organizer, Columbia Integrated System Laboratory (CISL) Seminar Series, 2013-present
  - Chair, IEEE New York Section EDS/SSCS Chapter, 2014-2015
  - Vice Chair, IEEE New York Section EDS/SSCS Chapter, 2012-2013
- Conference Organization Committee
  - Tutorial Chair on Energy-Efficient Computing for the Internet of Things - IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference (S3S), 2016
  - Registration Co-Chair - IEEE International Conference on Computer Design (ICCD), 2015
  - Student Design Contest Co-Chair - ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED), 2013-2014
- Conference Technical Program Committee (TPC) Track-Chairs and Members
  - TPC track co-chair: digital circuits and technology - ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED), 2015
  - TPC member: digital circuits and technology - ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED), 2013-2015
  - TPC member: subthreshold circuits - IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference (S3S), 2014-2015
  - TPC member: digital design - IEEE International Conference on Computer Design (ICCD), 2013 and 2015
  - TPC member: digital design - IEEE/ACM International Conference on VLSI Design (VLSID), 2013 and 2016
- Workshop Organizations
  - IEEE SSCS Distinguished Lecture Tour: Half-Day Colloquium on the Recent Advances in RF, Mixed-Signal, and Digital IC designs; Organize; sponsored by IEEE EDS/SSCS and Columbia University; Dec. 4, 2015
  - IEEE SSCS Distinguished Lecture Tour: Half-Day Colloquium on the Recent Advances in RF, Mixed-Signal, and Digital IC designs; Organize; sponsored by IEEE EDS/SSCS and Columbia University; Oct. 17, 2014

- Full-day Workshop on Engineering and Applied Science; Co-organize with Prof. Javad Lavaei, Prof. Christine P. Fleming, and Prof. Shiho Kawashima; Sponsored by Johns Hopkins Center for Talented Youth and Columbia SEAS Outreach Office; Sep. 20, 2014
- Workshop on Connected, Autonomously Powered Systems; A one-day in-depth discussion of the issues required to address the challenge of bringing energy harvesting, wireless communication, and self-powered systems to market; Co-Organize with Prof. John Kymissis and Prof. Harish Krishinawamy; sponsored by IEEE EDS/SSCS and Columbia University; Apr. 11 2014
- Grant Panel Participation
  - National Science Foundation
- Journal and Conference Paper Reviewers
  - *IEEE Journal of Solid-State Circuits, IEEE Transactions on Very Large Scale Integration Systems, IEEE Transactions on Circuits and System I and II, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, and many others*

## Teaching

- EECS 6321 Advanced Digital Electronic Circuits
  - Newly created after more than 10 years of the absence in the department curricula
  - Spring 2015, Spring 2014, Spring 2013, Spring 2012
- ELEN 6920 Topics in VLSI Systems Design – VLSI Architecture for Digital Signal Processing and Machine Learning
  - Newly created
  - Fall 2014, Fall 2015

## Invited Talks and Presentations

- Korea Institute of Energy Technology Evaluation and Planning, Ultra-Low-Energy Microsystems for the Internet of Things Era, Nov., 2015
- Columbia University Outreach Office and Seoul Science High School, Introduction to Modern Integrated Circuit Design, Oct., 2015
- Intel, Circuit Research Lab, Hillsboro OR, Tackling Variability Challenge in VLSI Circuits, Apr. 2015
- Columbia University, New York NY, Engineering Exploration Experience (EEE) by Society of Women Engineers (SWE), Mar. 2015
- University of Texas, Austin TX, Tackling Variability Challenge in VLSI Circuits, Jan. 2015
- Columbia University Outreach Office and Seoul Science High School, Introduction to Modern Integrated Circuit Design, Oct., 2014
- International Symposium on New Frontiers in Scientific Innovation (Organized by Korea Foundation of Advanced Studies (KFAS) and Chosun Ilbo), Seoul, Energy-Efficient Integrated Circuits and Systems for Emerging Applications, Jul. 2014, *more than 5,000 RSVPs*
- Seoul National University, Seoul, Advances in Energy-Efficient and Variation-Tolerant Integrated Circuits & Systems Design, Jul. 2014
- Korea Advanced Institute of Science and Technology, Daejeon, Advances in Energy-Efficient and Variation-Tolerant Integrated Circuits & Systems Design, Jul. 2014
- Samsung Electronics, System LSI, Hwaseong, Advances in Energy-Efficient and Variation-Tolerant Integrated Circuits & Systems Design, Jul. 2014

- SK-Hynix, Icheon, Advances in Energy-Efficient and Variation-Tolerant Integrated Circuits & Systems Design, Jul. 2014
- IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference (S3S), Monterey CA, "Parallelism and Pipelining in Ultra-Low Voltage Digital Circuits," Oct. 2013
- Columbia University Outreach Office and Seoul Science High School, Introduction to Engineering, Oct. 2013
- International Conference on IC Design and Technology (ICICDT), Austin TX, Extending Energy-Saving Voltage Scaling in Ultra Low Voltage Integrated Circuit Designs, May 2012
- Polytechnic Institute of New York University, Brooklyn NY, The Next Class of Computing: Millimeter-Scale," Nanoelectronic Devices for Defense and Security Conference, Aug. 2011
- Faculty Candidate Talks, University of Southern California, Columbia University, University of Washington at Seattle, Extremely Energy Efficient Circuit and System Design for Millimeter-Scale Medical Devices, Mar. 2011
- Job Talks, IBM TJ Watson Research Center, Intel Advanced Technology Development, AMD Research and Advanced Development Labs, Oracle Sun Lab, Texas Instruments Systems and Applications R&D Center, Extreme-Power Constrained Integrated Circuit Design, Jul.-Nov., 2010

## Patents

**Patents** (issued: 2, filed: 4, provisional filed: 0)

- Seongjong Kim, Mingoo Seok, "Circuits for Temperature Sensors," patent filed, 2015
- Mingoo Seok, Jiangyi Li, "Circuits for Physically Unclonable Function," patent filed, 2015
- Mingoo Seok, Peter Kinget, Teng Yang, "In-Situ Techniques for In-Field Sensing of NBTI Degradation in an SRAM Register File," patent filed, 2015
- Mingoo Seok, Peter Kinget, Teng Yang, Seongjong Kim, "Circuits for temperature sensors," patent filed, 2014
- Mingoo Seok, Jing-Fei Ren, Manish Goel, "Security of Cryptographic Devices Against Differential Power Analysis," US2013191652(A1), US8782446(B2), WO2013110055(A1), WO2013110055(A8), patent issued
- Mingoo Seok, Dennis Sylvester, David Blaauw, Scott Hanson Gregory K. Chen, "Pico-power Reference Voltage Generator," US2010327842(A1) US8564275(B2) WO2010151754(A2) WO2010151754(A3) TW201116968(A), KR20120132459 (A), JP2012531825(A), EP2446337(A2), CN102483634(A), patent issued, *commercially licensed*

## Invention Disclosures

- Yannis Tsvividis, Ning Guo, Mingoo Seok, "A Continuous-Time Apparatus for Generating Analog Look-up Tables and Generating Analog Nonlinear Functions," Disclosure filed, 2013
- Mingoo Seok, Yoonmyung Lee, Scott Hanson, David Blaauw, Dennis Sylvester, "Low leakage memory circuit," Disclosure filed, UM file number 3760
- Mingoo Seok, Scott Hanson, Jae-sun Seo, David Blaauw, Dennis Sylvester, "Robust low voltage read-only memory," Disclosure filed, UM file number 4159

## Students Supervised

### Postdocs:

Name	Project Area	Graduation/Status
Minhao Yang	TBD	2018 (estimated)

**PhD, Chair/Co-Chair:**

Name	Project Area	Graduation/Status
Seongjong Kim	Variation-Tolerant and Ultra-Low-Voltage Microprocessor Design	2016 (estimated)
Teng Yang (co-supervised by Prof. P. Kinget)	Multi-Modal and Fine-Grained On-Chip Monitoring Techniques for Better-Than-Worst-Case Design	2017 (estimated)
Doyun Kim	Event-Driven Systems and Circuits	2018 (estimated)
Jiangyi Li	Adaptive Integrated Power Management Unit Design	2019 (estimated)
Joao Pedro Cerqueira	Machine Learning Architecture and Circuits for Embedded Devices	2019 (estimated)
Zhewei Jiang	Brain Computer Interface System and Circuits	2019 (estimated)

**PhD, Committee:**

Name	Project Area	Graduation/Status
Christos Vezyrtzis	Continuous Time DSP	2013, IBM TJ Watson
John Sarik	Systems for Pervasive Electronics and Interfaces	2013
Jayanth Kuppambatti	Mixed-Signal Design Techniques in Scaled CMOS	2014, Startup
Chun-Wei Hsu	Voltage-Scalable Analog Circuit Design	2015, Analog Dev.
Chengrui Le	Efficient and Integrated Switched-Capacitor Converter	2014
Fabio Carte	Low Temperature Monolithic Integration for Silicon and Organic Electronics	2015
Ning Guo	Hybrid continuous-time computing	2016 (estimated)

**MS/BS Supervised:**

Name	Project Area	Graduation/Status
Jian Liu, MS	Asynchronous pipeline design	2012, Qualcomm
Hongtao Li, MS	Active decoupling capacitor design	2012, LSI
Junyan Gao, MS	Digital differential analyzer	2012, SanDisk
Kevin Kuo, MS	Design flow exploration	2012, Qualcomm
Changzhuo Chen, MS	Temperature sensor design	2012, CAS
Masayuki Pak, MS	Power grid integrity analysis	2012, Sony
Hongsen Yu, MS	On-chip SRAM design	2013, Marvell
Zhe Cao, MS	Pipeline and parallel architecture	2013, Marvell
Jiangyi Li, MS	Aging monitoring technique	2013, Columbia U.
Artem Lakoviev, MS	OFET design flow	2013, Argo-Logic
Christopher Hong, BS	Ultra-low-power processor	2013, Bloomberg
Kyung Min Lee, BS	Ultra-low-power processor	2013, Cornell
Zhenyu Zhu, MS	Ultra-low-power processor	2014, Cavium
Andreas Hoffman, BS	Energy-efficient motor control	2014
Beinuo Zhang, MS	Low-power cognitive computing	2014, Oracle
Cong Zhu, MS	Low-power floating point unit design	2014, Oracle
Jiachen Li, MS	Crosstalk noise analysis	2014, Oracle
Zhewei Jiang, MS	Low-power cognitive computing	2015, Columbia U.
Yini Zhou, MS	Fine-grained thermal monitoring	2016 (Broadcom)
Utkarsh Gupta, MS	Compressive-sensing decoder architecture	2016 (expected)

**Visitor Supervised:**

Name	Project Area	Duration/Status
Wei Jin	Ultra-low voltage circuits	2014-2016
Tianchan Guan	Machine-learning architecture for microsystems	2015-2017

**Grants and Contracts**

- SKHynix, “Fully-Integrated Power Electronics in DRAM Chips,” 1/1/2016-12/31/2017, PI, \$200,000.
- Samsung Global Research Organization (GRO), “Data-Processing Hardware Design Research for Fully-Implantable Brain-Computer-Interface Microsystems”, 9/1/2015-8/30/2016, PI, \$99,706
- National Science Foundation - SBIR/STTR Phase-I, “Low-Power Circuits for LDPC ASICs,” 7/1/2015-12/31/2015, Consultant, \$19,224.
- National Science Foundation, “CAREER: Addressing Deepening Variability Challenges for Next-Generation Margin-Free VLSI Computing Platform Design,” 6/1/2015-5/31/2020, PI, \$461,071.
- Defense Advanced Research Projects Agency ”ESP: Embedded Scalable Platforms for Terascale Energy-Efficient Computing,” 01/01/2013-12/31/2017, co-PI with Luca Carloni (PI, CU), Ken Shephard (co-PI, CU), Martha Kim (co-PI, CU), Magaret Martonosi (co-PI, Princeton), Alberto Sangiovanni-Vincentelli (co-PI, UC-Berkeley), Bill Gallanger (co-PI, IBM), John Knickerbocker (co-PI, IBM), Paul Andry (co-PI, IBM), Eugene O’Sullivan (co-PI, IBM), \$7,250,000.
- Catalyst Foundation ”Self-Aware Computing for Cyber Physical Systems,” 01/01/2013-12/31/2017, PI with Peter Kinget (co-PI, CU), \$338,468.
- National Science Foundation ”CPS: Synergy: Collaborative Research: Hybrid Continuous-Discrete Computers for Cyber-Physical Systems,” 09/01/2012-08/31/2015, co-PI with Yannis Tsividis (PI, CU), Simha Sethumadhavan (co-PI, CU), Michael Bryant (co-PI, UTA), and Benito R. Fernandez (co-PI, UTA), \$1,100,000.

## Referred Journals and Conference Publications

Total number of publications = 62, h-index = 18, i10-index = 23, total citation count = 1289 (12/2015)

### 2016

60. Yipeng Huang, Ning Guo, Mingoo Seok, Yannis Tsividis, Simha Sethumadhavan, “Evaluation of an Analog Accelerator,” *ACM/IEEE International Symposium on Computer Architecture*, 2016, submitted
59. Yini Zhou, Martha Kim, Mingoo Seok, “Holistic Design-Space Exploration of Temperature Sensor Networks for Dynamic Thermal Management,” *ACM/IEEE International Symposium on Computer Architecture*, 2016, submitted
58. Ning Guo, Yipeng Huang, Tao Mai, Shavil Patil, Chi Cao, Mingoo Seok, Simha Sethumadhavan, Yannis Tsividis, “Low-Energy Hybrid Analog/Digital Approximate Computation in Continuous Time,” *IEEE Journal of Solid-State Circuits (JSSC)*, 2015, *invited for the special issue*, submitted
57. Daniel Marti, Mattia Rigotti, Mingoo Seok, Stefano Fusi, “Energy-Efficient Neuromorphic Classifier,” *Neural Computation*, 2016, submitted
56. Doyun Kim, Mingoo Seok, “Fully-Integrated Low Drop-Out Regulator based on Event-Driven PI Control,” *IEEE International Solid-State Circuits Conference (ISSCC)*, 2016, *accepted for publication*

### 2015

55. Jae-Sun Seo, Mingoo Seok, “Digital CMOS Neuromorphic Processor Design Featuring Unsupervised Online Learning,” *IEEE/IFIP International Conference on VLSI and System-on-Chip (VLSI-SoC)*, 2015, **invited**, [link](#)
54. Teng Yang, Seongjong Kim, Peter R. Kinget, Mingoo Seok, “Ultra-compact and Voltage-Scalable Temperature Sensor Design for Dense Dynamic Thermal Management Techniques,” *IEEE Journal of Solid-State Circuits (JSSC)*, 2015, [link](#)

53. Doyun Kim, Jiangyi Li Mingoo Seok, "Energy-Optimal Voltage Model Supporting a Wide Range of Nodal Switching Rates for Early Design-Space Exploration," *IEEE International Conference on Computer Design (ICCD)*, 2015, [link](#)
52. Seongjong Kim, Mingoo Seok, "A  $30.1\mu\text{m}^2$ ,  $\pm 1.1^\circ\text{C}$ - $3\sigma$ -Error, 0.4-to-1.0V Temperature Sensor based on Direct Threshold-Voltage Sensing for Dense On-Chip Thermal Monitoring," *IEEE Custom Integrated Circuits Conference (CICC)*, 2015, [link](#)
51. Ning Guo, Yipeng Huang, Tao Mai, Shavil Patil, Chi Cao, Mingoo Seok, Simha Sethumadhavan, Yannis Tsividis, "Continuous-Time Hybrid Computation with Programmable Nonlinearities," *European Solid-State Circuits Conference (ESSCIRC)*, 2015, [link](#)
50. Daniel Marti, Mattia Rigotti, Mingoo Seok, Stefano Fusi, "Energy-Efficient Neuromorphic Classifier," *ArXiv.org*, 2015, [link](#)
49. Beinuo Zhang, Zhewei Jiang, Qi Wang, Jae-Sun Seo, Mingoo Seok, "A Neuromorphic Neural Spike Clustering Processor for Deep-Brain Sensing and Stimulation Systems," *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, 2015 [link](#)
48. Jiangyi Li and Mingoo Seok, "A  $3.07\mu\text{m}^2/\text{bitcell}$  Physically Unclonable Function with 3.5% and 1% Bit-Instability across 0 to  $80^\circ\text{C}$  and 0.6 to 1.2V in a 65nm CMOS," *IEEE Symposium on VLSI Circuits (VLSI)*, 2015 [link](#)
47. Seongjong Kim, Mingoo Seok, "Variation-Tolerant Near-threshold Microprocessor Design with Low-Overhead, Within-a-Cycle In-situ Error Detection and Correction Technique," *IEEE Journal of Solid-State Circuits (JSSC)*, 2015, [link](#)
46. Zhewei Jiang, Qi Wang, Mingoo Seok, "A Low Power Unsupervised Spike Sorting Accelerator Insensitive to Clustering Initialization in Sub-optimal Feature Space," *ACM/EDAC/IEEE Design Automation Conference (DAC)*, 2015, [link](#)
45. Fabio Carta, Htay Hlaing, Hassan Edrees, Shyuan Yang, Mingoo Seok, Ioannis Kymissis, "Co-Development of Complementary Technology and Modified-CPL Family for Organic Digital Integrated Circuits," *Material Research Society Proceedings*, vol.1795, 2015, [link](#)
44. Teng Yang, Doyun Kim, Peter R. Kinget, Mingoo Seok, "In-situ Techniques for In-field Sensing of NBTI Degradation in an SRAM Register File," *IEEE International Solid-State Circuits Conference (ISSCC)*, 2015, [link](#)

## 2014

43. Seongjong Kim, Mingoo Seok, "Analysis and Optimization of In-Situ Error Detection Techniques in Ultra-Low-Voltage Pipeline," *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, 2014, [link](#)
42. Seongjong Kim, Mingoo Seok, "Reconfigurable Interconnect-Driving Technique for Ultra-Dynamic-Voltage-Scaling Systems," *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, 2014, [link](#)
41. Seongjong Kim, Mingoo Seok, "R-Processor: 0.4V Resilient Processor with a Voltage-Scalable and Low-Overhead In-Situ Error Detection and Correction Technique in 65nm CMOS," *IEEE Symposium on VLSI Circuits (VLSI)*, 2014, [link](#)
40. Jiangyi Li, Mingoo Seok, "Robust and In-Situ Self-Testing Technique for Monitoring Device Aging Effects in Pipeline Circuits," *ACM/EDAC/IEEE Design Automation Conference (DAC)*, 2014, [link](#)
39. Teng Yang, Seongjong Kim, Peter R. Kinget, Mingoo Seok, "0.6-1.0V,  $279\mu\text{m}^2$ ,  $0.92\mu\text{W}$  Temperature Sensor with  $< +3.2/-3.4^\circ\text{C}$  Error for Dense On-Chip Thermal Monitoring," *IEEE International Solid-State Circuits Conference (ISSCC)*, pp.282-283, 2014, [link](#)

## 2013

38. Mingoo Seok, Zhe Cao, "Parallelism and Pipelining in Ultra-Low Voltage Digital Circuits," *IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference (S3S)*, 2013, **invited**, [link](#)
37. Yoonmyung Lee, Mingoo Seok, Scott Hanson, Dennis Sylvester, David Blaauw, "Achieving Ultra-low Standby Power with an Efficient SCCMOS Bias Generator," *IEEE Transactions on Circuits and Systems II (TCAS-II)*, 2013, [link](#)
36. Mohammad Hassan Ghaed, Gregory Chen, Razi-ul Haque, Michael Wiecekowsky, Yejoong Kim, Gyouho Kim, Yoonmyung Lee, Inhee Lee, David Fick, Daeyeon Kim, Mingoo Seok, Kensall, and K. Wise, David Blaauw, and Dennis Sylvester, "Circuits for a Cubic-Millimeter Energy-Autonomous Wireless Intraocular Pressure Monitor," *IEEE Transactions on Circuits and Systems I (TCAS-I)*, vol.60, no.12, pp.3152-3162, 2013, [link](#)
35. Matthew Fojtik, Daeyeon Kim, Gregory K. Chen, Yu-Shiang Lin, David Fick, Junsun Park, Mingoo Seok, Mao-Ter Chen, Zhiyoong Foo, David Blaauw, Dennis Sylvester, "Millimeter-Scale Energy-Autonomous Sensor System with Stacked Battery and Solar Cells," *IEEE Journal of Solid-State Circuits (JSSC)*, vol.48, no.3, pp.801-813, Mar. 2013, [link](#)
34. Yu Chen, Mingoo Seok, Steve M. Nowick, "Robust and Energy-Efficient Asynchronous Dynamic Pipelines for Ultra-Low-Voltage Operations Using Adaptive Keeper Control," *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, pp.267-272, 2013, [link](#)
33. Jian Liu, Steve M. Nowick, Mingoo Seok, "Soft MOUSETRAP: a Bundled-Data Asynchronous Pipeline Scheme Tolerant to Random Variations at Ultra Low Supply Voltages," *IEEE International Symposium on Asynchronous Circuits and Systems (ASYNC)*, pp.1-7, 2013, [link](#)

## 2012

32. Mingoo Seok, "Performance and Energy-Efficiency Improvement through Modified CPL in Organic Transistor Integrated Circuits," *ACM/IEEE International Symposium on Low Power Electronics and Designs (ISLPED)*, pp. 215-220, 2012, [link](#)
31. Mingoo Seok, "A Fine-Grained Many VT Design Methodology for Ultra Low Voltage Operations," *ACM/IEEE International Symposium on Low Power Electronics and Designs (ISLPED)*, pp. 161-166, 2012, [link](#)
30. Mingoo Seok, "Decoupling Capacitor Design Strategy for Minimizing Supply Noise of Ultra Low Voltage Circuits," *ACM/EDAC/IEEE Design Automation Conference (DAC)*, pp. 968-973, 2012, [link](#)
29. Dongsuk Jeon, Mingoo Seok, Zhengya Zhang, David Blaauw, Dennis Sylvester, "A Design Methodology for Voltage Overscaled Ultra-Low Power Systems," *Transactions on Circuits and Systems II (TCAS-II)*, vol.59, no.12, pp.952-956, Dec. 2012, [link](#)
28. Mingoo Seok, Gyouho Kim, David Blaauw, Dennis Sylvester, "A Portable 2-Transistor Picowatt Temperature-Compensated Voltage Reference Operating at 0.5V," *IEEE Journal of Solid-State Circuits (JSSC)*, vol.47, no.10, pp.2534-2545, Oct. 2012, [link](#)
27. Dongsuk Jeon, Mingoo Seok, Chaitali Chakrabarti, David Blaauw, Dennis Sylvester, "A Super-Pipelined Energy Efficient Subthreshold 240MS/s FFT Core in 65nm CMOS," *IEEE Journal of Solid-State Circuits (JSSC)*, vol.47, no.1, pp.23-34, 2012, **invited**, [link](#)
26. Mingoo Seok, Dongsuk Jeon, Chaitali Chakrabarti, David Blaauw, Dennis Sylvester, "Extending Energy-Saving Voltage Scaling in Ultra Low Voltage Integrated Circuit Designs," *International Conference on IC Design and Technology (ICICDT)*, pp.1-4, 2012, **invited**, [link](#)

## 2011



25. Mingoo Seok, Dongsuk Jeon, Chaitali Chakrabarti, David Blaauw, Dennis Sylvester, "A 0.27V, 30MHz, 17.7nJ/transform 1024-pt Complex FFT Core with super-pipelining," *International Solid-State Circuits Conferences (ISSCC)*, pp. 342-344, 2011, [link](#)
24. Mingoo Seok, David Blaauw, Dennis Sylvester, "Robust Clock Network Design Methodology for Ultra-Low Voltage Operations," *Journal on Emerging and Special Topics on Circuits and Systems (JETCAS)*, vol.1. no.2, pp.120-130, 2011, **invited**, [link](#)
23. Mingoo Seok, Gregory Chen, Scott Hanson, Michael Wieckowski, David Blaauw, Dennis Sylvester, "Mitigating Variability in Near Threshold Computing," *Journal on Emerging and Special Topics on Circuits and Systems (JETCAS)*, vol.1. no.1, pp.42-49, 2011, **invited**, [link](#)
22. Mingoo Seok, Scott Hanson, David Blaauw, Dennis Sylvester, "Sleep Mode Analysis and Optimization with Minimal-Sized Power Gating Switch for Ultra-low Vdd Operations," *Transactions on VLSI systems (TVLSI)*, vo.20. no.4, pp.605-615, 2011, [link](#)
21. Gregory Chen, Hassan Ghaed, Razi-Ul Haque, Michael Wieckowski, Yejoong Kim, Gyouho Kim, David Fick, Daeyeon Kim, Mingoo Seok, Kensall Wise, David Blaauw, Dennis Sylvester, "A 1 Cubic Millimeter Energy-Autonomous Wireless Intraocular Pressure Monitor," *International Solid-State Circuits Conferences (ISSCC)*, pp.310-312, 2011, [link](#)
20. Mingoo Seok, Dongsuk Jeon, Chaitali Chakrabarti, David Blaauw, Dennis Sylvester, "Pipeline Strategy for Improving Optimal Energy Efficiency in Ultra-Low Voltage Design" *ACM/IEEE Design Automation Conference (DAC)*, pp.990-995, 2011, [link](#)
19. Dongsuk Jeon, Mingoo Seok, Chaitali Chakrabarti, David Blaauw, Dennis Sylvester, "Energy-Optimized High Performance FFT Processor," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pp.1701-1704, 2011, [link](#)
18. Daeyeon Kim, Gregory K. Chen, Matthew Fojtik, Mingoo Seok, Dennis Sylvester, David Blaauw, "A Femtowatt-Scale Ultra-Low Leakage 10T SRAM with Speed Compensation Scheme," *International Symposium on Circuits and Systems (ISCAS)*, pp.69-72, 2011, [link](#)

## 2010

17. Mingoo Seok, Gyouho Kim, David Blaauw, Dennis Sylvester, "Variability Analysis of a Digitally Trimmable Ultra-Low Power Voltage Reference," *European Solid-State Circuits Conference (ESSCIRC)*, pp.110-113, Sep, 2010, [link](#)
16. Mingoo Seok, David Blaauw, Dennis Sylvester, "Clock Network Design for Ultra-Low Power Applications," *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, pp.271-276, Aug, 2010, [link](#)
15. Mingoo Seok, Scott Hanson, Michael Wieckowski, Gregory K. Chen, Yu-Shiang Lin, David Blaauw, Dennis Sylvester, "Circuit Design Advances to Enable Ubiquitous Sensing Environments," *International Symposium on Circuits and Systems (ISCAS)*, pp.285-288, 2010, **invited**, [link](#)
14. Gregory K. Chen, Matthew Fojtik, Daeyeon Kim, David Fick, Junsun Park, Mingoo Seok, Mao-Ter Chen, Zhiyoong Foo, Dennis Sylvester, David Blaauw, "A Millimeter-Scale Nearly-Perpetual Sensor System with Stacked Battery and Solar Cells," *International Solid-State Circuits Conference (ISSCC)*, pp.288-289, 2010, [link](#)

## 2009

13. Mingoo Seok, Gyouho Kim, Dennis Sylvester, David Blaauw, "A 0.5V 2.2pW 2-Transistor Voltage Reference," *Custom Integrated Circuit Conference (CICC)*, pp.577-580, 2009, [link](#)

12. Michael Wieckowski, Gregory K. Chen, Mingoo Seok, Dennis Sylvester, David Blaauw, "A Hybrid DC-DC Converter for Nanoampere Sub-1V Implantable Applications," *IEEE Symposium on VLSI Circuits (VLSI)*, pp.166-167, 2009, [link](#)
  11. Scott Hanson, Mingoo Seok, Yu-shiang Lin, Zhiyoong Foo, Daeyeon Kim, Yoonmyung Lee, Nurrachman Liu, Dennis Sylvester, David Blaauw, "A Low-Voltage Processor for Sensing Applications With Picowatt Standby Mode," *Journal of Solid State Circuits (JSSC)*, vol.44, no.4, pp.1145-1155, 2009, **invited**, [link](#)
- 2008**
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4. Zhewei Jiang, Mingoo Seok, "A Low Power Unsupervised Spike Sorting Accelerator Insensitive to Clustering Initialization in Sub-Optimal Feature Space," *Data on a Mission, Internet of Things, A Mini-Symposium with Industry Experts, Columbia University*, May, 2015
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2. Paolo Mantovani, Emilion G. Cota, Seongjong Kim, Kevin Tien, Johnnie Chan, Giuseppe Di Guglielmo, Christian Pilato, Martha A. Kim, Mingoo Seok, Kenneth Shepard, Luca P. Carloni, "Benchmarking Methodology for Embedded Scalable Platforms," *SEAK: DAC Workshop on Suite of Embedded Applications and Kernels during ACM/EDAC/IEEE Design Automation Conference*, 2014, [link](#)
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