

MYUNGHWAN PARK

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RESEARCH INTERESTS

My overall research interest is the physics of integrated circuits in analog and RF domain. The study includes nonlinear circuit analysis of RF and analog domain circuit, random number generator design, and wireless power transfer circuit design. I am also interested in the analysis of RF coupling on IC circuit.

EDUCATION

University of Maryland *Sep 2008 - May 2013(expected)*
Ph.D. Candidate in Electrical and Computer Engineering

University of Maryland *May 2012*
M.S. in Electrical and Computer Engineering

Seoul National University *Sep 2006 - Aug 2008*
M.S. in Electrical and Computer Engineering

Yonsei University *Mar 2000 - Aug 2006*
B.S. in Electrical and Computer Engineering

RESEARCH EXPERIENCE

**University of Maryland,
Institute for Research in Electronics and Applied Physics** *Sep 2009 - Present*
Graduate Research Assistant *College Park, MD*

- Developed high speed Random Number Generator for cryptographic application,
- Developed high speed chaotic oscillator using On Semiconductor 0.5um process.
- Performed analog and RF measurements of IC chip.
- Studied electromagnetic interference effect of microwave CMOS circuits.
- Built numerical and Berkeley Short-channel IGFET(BSIM) model of nonlinear chaotic microwave circuits using MATLAB and ADS.

MediaTek Wireless Inc. *Jun 2012 - Jul 2012*
Research Intern *Woburn, MA*

- Developed finite element method(FEM) simulation of wireless resonant power transfer system.
- Simulated and built circuit models for wireless power transfer system (Resonator, Coil, and RF PA).
- Designed Class D and E RF power amplifier with variable load-pull analysis.

Smart Imaging Systems Inc. *May 2009 - Sep 2009*
Research Intern *Beltsville, MD*

- Fabricated silicon photodiodes for X-ray detection and characterized DC and uniformity tests.
- Performed the wire-bonding of fabricated silicon photodiodes to the PCB boards

University of Maryland, Mixed Signal Design Laboratory *Sep 2008 - May 2009*
Graduate Research Assistant *College Park, MD*

- Accompanied flexible nano-particle battery development using RuOx,

- Developed a low power voltage regulator for energy harvesting power system.
- Assisted in integration of the energy harvesting power system of battery, voltage regulator, and DC-DC converter.

**Seoul National University,
Inter-University Semiconductor Research Center**
Graduate Research Assistant

Sep 2006 - Aug 2008
Seoul, South Korea

- Developed a process for compound resonant tunneling diodes(RTD), and ultra-high speed HEMT on InP substrates.
- Performed DC and RF measurement for the high frequency devices (HEMT)

Yonsei University, Electronic Device and Materials Laboratory
Undergraduate Research Assistant

Dec 2005 - Jun 2006
Seoul, South Korea

- Fabricated ZnO nanowires using temperature controlled furnace.

TECHNICAL STRENGTHS

Extensive IC design, tape-out, test, and analysis :

IC Design : Design(IBM 130nm PDK, MOSIS On-Semiconductor 0.35um process)

Measurement : Digital Oscilloscope, Network Analyzer, Spectrum Analyzer, Probe Station, Semiconductor Parameter Analyzer, GPIB Instrument Automation, etc

Simulation Tools : ADS, Orcad Spice, HFSS, FastHenry, FEMM, Cadence(Layout)

Analysis : MATLAB, LABVIEW, HPVEE, PCB Design

Semiconductor Fabrication : E-beam and Photo Lithography, Thin Film and Metal Deposition, Mask Design, etc

HONORS AND AWARDS

Jacob K. Goldhaber Travel Award Grant,	Apr, 2012
International Conference Student Support Award, University of Maryland,	Mar, 2012
Cho-Shim Presbyterian Church Scholarship, Maryland,	Feb, 2011
Travel Assistance Award, Dynamics Day	Dec, 2010
Merit-Based scholarship, Yonsei Univeristy, Seoul, South Korea,	Sep, 2005
National Honor Society, International School of Luxembourg,	1998

PUBLICATIONS

Journal Articles

- [J2] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "On-Chip CMOS Boolean Chaotic Oscillator for Random Number Generation", *IEEE Transactions on Circuits and Systems II*, Submitted for publication.
- [J1] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "Chaos in CMOS inverter coupled with ESD circuits Under microwave excitation", *IEEE Transactions on Electromagnetic Compability*, Submitted for publication.

Conference Publications

- [C9] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "Modeling Chaos in On-Chip Ultra-Wideband Chaotic Oscillator", *Proceeding of IEEE International Microwave Symposium*, 2012.
- [C8] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "Source of Chaos in Radio Frequency MOSFETs", Dynamics Day 2012, Baltimore, MD, 2012
- [C7] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "Phase synchronization of directly coupled Boolean Chaos Oscillators", *Dynamics Day 2011*, Durham, 2011. (Travel Assistance Award)
- [C6] Myunghwan Park, Kwangsik Choi, Satpal Singh, Shahid Aslam, and Martin Peckerar, "Low Leakage Current Technology in P+N Silicon Photodiode Detector", *Proceeding of IEEE International Semiconductor Device Research Symposium*, 2009.
- [C5] Myunghwan Park, Kwangsik Choi, and Martin Peckerar, "Ultra-low Power Voltage Regulator for RF-DC Energy Harvesting", *Proceeding of IEEE International Semiconductor Device Research Symposium*, 2009.
- [C4] Hyungtae Kim, Myunghwan Park, and Kwangseok Seo, "40 Gbps operation of mobile and its application to weighted-sum threshold logic gate using only RTDS", *Proceeding of IEEE Indium Phosphide and Related Materials Conference*, 2008.
- [C3] Seong-Jin Yeon, Myunghwan Park, and Kwang-Seok Seo, "Novel Sloped Etch Process for 15nm InAlAs/InGaAs Metamorphic HEMTs", *Proceedings of the 7th IEEE International Conference on Nanotechnology*, 2007
- [C2] Seong-Jin Yeon, Myunghwan Park, and Kwang-Seok Seo, "610 GHz In_{0.52}AlAs/In_{0.75}GaAs Metamorphic HEMTs with an Ultra-Short 15-nm-Gate", *Proceeding of IEEE International Electron Devices Meeting*, 2007. (World's Highest Record)
- [C1] Myunghwan Park, J.M. Sung, J.E. Oh, K.S. Seo, "Study on the electrochemical etching in the Sb-based heterostructures", *Conference of the Institute of Electronics Engineers of Korea (IEEK)*, 2007

Patent

- [P1] Myunghwan Park, John Rodgers, and Daniel P. Lathrop, "On-Chip Ultra-wideband Chaotic Oscillator", *US Patent under provisional*, 2011.

Dissertation

- [D3] Myunghwan Park, Chaos in Cryptographic Application and Nonlinear Circuit Analysis, *Ph.D. Dissertation*, University of Maryland, 2013.
- [D2] Myunghwan Park, A Study of Nanoscale Resonant Tunneling Diodes for Digital Circuit Application, *M.S. Dissertation*, Seoul National University, 2008.

[D1] Myunghwan Park, ZnO Nanomaterials Synthesized by Vapor-Solid Mechanism, *B.S. Dissertation*, Yonsei University, 2006.

INVITED TALKS AND PRESENTATIONS

- [T4] Myunghwan Park, "Chaos in Cryptographic Application and Nonlinear Circuit Analysis", Graduate Student Talk, University of Maryland, MD, 2012.
- [T3] Myunghwan Park, "Resonant Wireless Power Transfer", MediaTek Wireless, MA, 2012.
- [T2] Myunghwan Park, "Chaos in CMOS integrated circuits", Graduate Review Interaction Day, University of Maryland, MD, 2012.
- [T1] Myunghwan Park, "Source of Chaos in Radio Frequency MOSFETs", MURI talk, University of Maryland, MD, 2011.

TEACHING EXPERIENCE

University of Maryland Fall 2010 - Spring 2012
Undergraduate Tutor *College Park, MD*

- Gave private tutoring for undergraduate students with Device Physics(ENEE 307) and Analog Circuits (ENEE 303)

Seoul National University Spring 2007
Graduate Teaching Assistant, Electronic Circuits Lab(EE 430.213A) *Seoul, South Korea*

- Supervised lab class for sophomore students.

Seoul National University Fall 2006
Graduate Teaching Assistant, Analog Electronic Circuit(EE 420.207) *Seoul, South Korea*

- Arranged extraneous and necessary classes for students, graded hws and final projects.

PROFESSIONAL SERVICE

Organizer, Graduate Research Interaction Day, University of Maryland
Manager, Korea-US Science and Engineering Association for Washington Chapter
Student Member, IEEE Microwave Theory and Techniques Society, and Circuits and Systems
Military Service, Korean Army

REFERENCES

Dr. Daniel P. Lathrop
Professor of Physics
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University of Maryland, College Park, MD
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Dr. John C. Rodgers
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Dr. Kwangseok Seo
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