

Resume

TAEWOOK KANG

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EDUCATION

- | | |
|---|-----------------------|
| University of Michigan | Sep. 2016 – Current |
| • Graduate Student Research Assistant, in Electrical and Computer Engineering | |
| Seoul National University | Mar. 2011 – Feb. 2013 |
| • M.S. in Electrical and Computer Engineering | |
| Seoul National University | Mar. 2007 – Feb. 2011 |
| • B.S. in Electrical and Computer Engineering | |

RESEARCH INTERESTS

- **pH sensor based on ISFET**
 - Small size and low power module

RESEARCH EXPERIENCES

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| <u>Mixed-Signal IC and System Group, Seoul National University</u> | Jan. 2011 – Jun. 2013 |
| • Advisor: Prof. Jaeha Kim | |
| • M.S. thesis : Designing an Optimum On-chip Inductor Using Magnetic Core | |
| • Magnetic core of integrated inductor <ul style="list-style-type: none">• Designed an open-loop magnetic core structure for 2-D integrated inductor and verified its effectiveness by HFSS simulation and experiments using PCB and fabricated inductor IC. | |
| • LED driver <ul style="list-style-type: none">• Designed and taped out LED driver IC using single-stage boost converter topology while receiving 110-VAC or 220-VAC voltage source.• To achieve high power factor, the proposed LED driver used hysteretic control in current regulation. | |
| • Buck converter type gate driver <ul style="list-style-type: none">• Designed and taped out power saving gate driver IC using bi-directional buck converter topology.• The proposed pulse generator circuit provides high frequency operation and high duty-cycle resolution. | |
| • Flyback converter type gate driver <ul style="list-style-type: none">• Designed and taped out power saving gate driver IC using bi-directional flyback converter topology.• The proposed gate driver senses and regulates the mini-transformer current to minimize conduction loss. | |
| • Phase-Interpolating Digital Pulse-Width Modulator <ul style="list-style-type: none">• Designed and taped out low power and wide-range DPWM IC.• Relaxation oscillator generates 80-kHz to 80-MHz clock, while the counter and phase interpolator handle coarse and fine phase resolution, respectively. | |

Biophotonics and Nano Engineering Lab., Seoul National University

Jun. 2010 – Dec. 2010

- Undergraduate researcher
- Advisor: Prof. Sunghoon Kwon
- Wrote an undergraduate graduation thesis
: Changing Self-Assembly by Controlling Magnetic Dipole Coupling Effect of Superparamagnetic Nano Particle and Multi-Bit Magnetic Patterning

PUBLICATIONS AND PATENTS

International Journal Articles

- Yoontaek Lee, **Taewook Kang**, and Jaeha Kim, "[A 9-11 bits Phase-Interpolating Digital Pulse-Width Modulator with 1000X Frequency Range](#)", *IEEE Trans. Industry Applications*, pp. 3376-3384, 2015
- **Taewook Kang** and Jaeha Kim, "Design and Analysis of 37.5% Energy-Recycling Flyback-Type Class-D Gate Driver IC with 5-to-15V Level-Conversion," *IEEE Trans. Industry Applications*, vol. 52, no. 4, pp.3324-3331, 2016

International Conferences

- **Taewook Kang** and Jaeha Kim, "[Design and Analysis of 37.5% Energy-Recycling Flyback-Type Class-D Gate Driver IC with 5-to-15V Level-Conversion](#)," *Energy Conversion Congress & Expo (ECCE)*, pp. 2159-2163, Sep. 2014
- Yoontaek Lee, **Taewook Kang**, and Jaeha Kim, "[A 9~11-bit Phase-Interpolating Digital Pulse-Width Modulator with 1000:1 Frequency Range](#)," *Energy Conversion Congress & Expo (ECCE)*, pp. 2172-2176, Sep. 2014
- **Taewook Kang** and Jaeha Kim, "[Design and Analysis of a Buck-Type Class-D Gate Driver IC](#)," *Applied Power Electronics Conference and Exposition (APEC)*, pp. 2600-2604, Mar. 2014
- **Taewook Kang**, Yoontaek Lee, Myeong-Jae Park, and Jaeha Kim, "[A 15-V, 40-kHz Class-D Gate Driver IC with 62% Energy Recycling Rate](#)," *Asian Solid-State Circuits Conference (A-SSCC)*, pp. 377-380, Nov. 2013.
- **Taewook Kang** and Jaeha Kim, "[Investigations on On-Chip Planar Inductor Design with Post-Processed Magnetic Core for DC-DC Converter Applications](#)", *ECCE Asia*, pp. 1079-1083, Jun. 2013.

Patents

- Jong Hyun Shin, Jaeha Kim, Hyun Soo Park, Jung-ik Ha, and **Taewook Kang**, "[POWER SUPPLY AND GATE DRIVER THEREIN](#)," U.S. Patent 20150188404A1, issued Jul. 2, 2015.
- Jaeha Kim, Jung-Ik Ha, and **Taewook Kang**, "[Apparatus for controlling power devices and method for controlling power devices using same](#)," Korea Patent, WO 2014025110 A1, issued Feb. 13, 2014.

WORK EXPERIENCES

Analog Circuit Designer at Silicon Mitus

June. 2013 – Present

- Full-time analog circuit designer
- A fabless company focusing on high-performance PMIC and achieving more than \$ 100 million annual revenue.
- Implementing own simulation environment to improve design efficiency using python language.
- **Fuel Gauge IC**: Monitoring the state of charge of Li-ion battery while sensing the current. Working on digital algorithm with both Verilog code and analog circuits. Verifying the synthesized logic with an FPGA board. The fabricated IC is integrated in Samsung Mobile products. We applied for a patent (currently under consideration) where I am named as a second contributor.
- **Micro-USB Interface IC**: Handling various USB accessories in mobile phone. Participating in five versions of commercialized IC integrated in Samsung Mobile products. Designing basic analog blocks,

such as band-gap reference, oscillator, amplifier, charge pump, etc. Verifying whole IC by using VCS co-simulation. Handling actual field problems not explicitly appearing in simulation, such as ESD, silicon leakage, spice model mismatch, etc.

- **Wireless Charger IC:** Mainly composed of a synchronous rectifier, LDO, and SAR ADC to support dual wireless charging modes (WPC and PMA) for mobile application. Verifying individual analog circuits and finalizing whole IC by using VCS co-simulation. It is currently being tested.

TEACHING EXPERIENCES

Verilog-A class, Teaching Assistant Feb. 2012

- Verilog-A class for students and industry engineers.
- Preparing class materials.

Electronic Circuits, Teaching Assistant 2nd semester, 2011

- Class for undergraduate students.

Graduate Students Seminar, Teaching Assistant 1st semester, 2011

- Topics in Semiconductor Devices.

BaeNaSa Educational Organization, Volunteer Lecturer Sep. 2009 – Dec. 2009

- Teaching math to middle school students from low income groups.

HONORS AND AWARDS

Presidential Scholarship, Korea Science Foundation, Korea Mar. 2007– Feb. 2011

- Covering tuition and living expenses of \$10,000/year during undergraduate studies

COMPUTER SKILLS

- Cadence software (SpectreRF, Virtuoso, Calibre, AMS), Synopsys software (HSPICE, VCS), CadSoft EAGLE, Ansys HFSS
- Verilog, SystemVerilog, Verilog-A
- Python, C, C++, MATLAB

EXTRACURRICULAR ACTIVITIES

SNUPO, the Largest Amateur Orchestra in Seoul National University Sep. 2008 – Sep. 2011

- Performed five times in biannual concert as a cellist while serving as a principal of cello and vice president.

Foreign Student Mentor, SNU Buddy Jun. 2008 – Jun. 2009

- Mentoring foreign students and helping them to adjust to college life.

Student Representatives of Electrical Engineering Department Mar. 2007 – Feb. 2011

- Representing up to 50 colleagues in the EE department.