

## RESEARCH INTERESTS

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- **Display driving circuits** (OLED/u-LED/OLEDs displays driver IC, pixel circuit)
- **TFT circuits** (analog and digital circuits using a-Si, oxide, LTPS TFTs on flexible substrate)
- **Sensor readout circuits** (circuits for resistive & capacitive sensors, sensor mismatch calibration)
- **Power management circuits** (switch-mode power supply, low-dropout regulator, charge pump)
- **Biomedical circuits** (circuits for artificial skin, neural stimulator, temporal interface stimulation)
- **Memory circuits** (word-line biasing, power management, analog circuits for 3D NAND flash memory)

## EDUCATION

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Feb. 2019	<b>Hanyang University - Ph.D.</b> in Electronics and Computer Engineering <ul style="list-style-type: none"><li>• Dissertation: High-Reliability Gate Driver and Small-Area High-Resolution Data Driver for Flexible Active-Matrix Displays</li><li>• Academic Advisor: Byong-Deok Choi</li></ul>	Seoul, Korea
Feb. 2012	<b>Hanyang University - M.S.</b> in Electronics and Computer Engineering <ul style="list-style-type: none"><li>• Dissertation: Design of a Low-Ripple, High-Efficiency Pulse Frequency Modulation Buck DC-DC Converter using a Dynamic Comparator</li><li>• Academic Advisor: Byong-Deok Choi</li></ul>	Seoul, Korea
Feb. 2010	<b>Hanyang University - B.S.</b> in Electronic Engineering <ul style="list-style-type: none"><li>• Dissertation: High Slew-rate Buffer Amplifier for TFT-LCD Source Driver</li></ul>	Seoul, Korea

## PROFESSIONAL EXPERIENCES

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Mar. 2023 ~ Present	<b>Hanyang University ERICA</b> School of Electrical Engineering Assistant Professor	Ansan, Korea
Mar. 2022 ~ Feb. 2023	<b>Gachon University</b> Department of Electronic Engineering Assistant Professor	Seongnam, Korea
Feb. 2018 ~ Feb. 2022	<b>SK Hynix Inc.</b> NAND flash memory circuit design group Senior researcher (development of analog circuits for 3D NAND flash memory)	Icheon, Korea
Mar. 2017 ~ Aug. 2017	<b>Soongsil University</b> School of Electronic Engineering Lecturer (undergraduate class: Circuits and systems for displays)	Seoul, Korea
Mar. 2015 ~ June 2015	<b>Hanyang University</b> Department of Electronics and Computer Engineering Lecturer (undergraduate class: Display driving circuits)	Seoul, Korea

## PUBLICATIONS (JOURNAL PAPERS)

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- 16 **High-Accuracy Readout Circuits for High-Resolution Active Matrix Resistive Sensor Arrays**  
Seong-Ro Lee, Wiman Yoo, and **Jong-Seok Kim**  
**IEEE Sensors Journal** (IF: 4.3), Dec 2023
- 15 **A high-light-load-efficiency, low-ripple-voltage PFM buck converter for IoT applications**  
**Jong-Seok Kim**, Jin-O Yoon, and Byong-Deok Choi  
**IEEE Transactions on Power Electronics** (IF: 5.967), Vol. 37, no. 5, pp.5763-5772, May 2022
- 14 **Uniform pressure responses for nanomaterials-based biological on-skin flexible pressure sensor array**  
**Jong-Seok Kim**, Yechan So, Sangmin Lee, Changhyun Pang, Wanjun Park, and Sungwoo Chun,  
**Carbon** (IF: 11.307), 181, 169-176, Aug. 30, 2021
- 13 **An artificial neural tactile sensing system**  
Sungwoo Chun\*, **Jong-Seok Kim\*** (co-first author), Yongsang Yoo, Youngin Choi, Sung Jun Jung, Dongpyo Jang, Gwangyeob Lee, Kang-Il Song, Kum Seok Nam, Inchan Yoon, Donghee Son, Changhyun Pang, Yong Jeong, Hachul Jung, Young-Jin Kim, Byong-Deok Choi, Jaehun Kim, Sung-Phil Kim, Wanjun Park, and Seongjun Park  
\*Equally contributed  
**Nature Electronics** (IF: 33.255), 4, 429-438, June 30, 2021
- 12 **A low-area and full-nonlinear 10-bit column driver with low-voltage DAC and switched-capacitor amplifier for active-matrix displays**  
**Jong-Seok Kim**, Jin-O Yoon, and Byong-Deok Choi  
**IEEE Journal of Solid-State Circuits** (IF: 6.126), 56, 488-500, Feb. 2021
- 11 **Electrical stability analysis of dynamic logic using amorphous Indium-Gallium-Zinc-Oxide TFTs**  
Yong-Duck Kim, **Jong-Seok Kim**, Jong-Il Lee, Ki-Lim Han, Beom-Su Kim, Jin-Seong Park, and Byong-Deok Choi  
**IEEE Electron Device Letters** (IF: 4.816), 40, 1128-1131, July 2019
- 10 **A high-reliability carry-free gate driver for flexible displays using a-IGZO TFTs**  
**Jong-Seok Kim**, Jung-Woo Byun, Jun-Hwan Jang, Yong-Duck Kim, Ki-Lim Han, Jin-Seong Park, and Byong-Deok Choi  
**IEEE Transactions on Electron Devices** (IF: 3.221), 65, 8, 3269-3276, 2018
- 9 **Dynamic logic circuits using a-IGZO TFTs**  
**Jong-Seok Kim**, Jun-Hwan Jang, Yong-Duck Kim, Jung-Woo Byun, Kilim Han, Jin-Seong Park, and Byong-Deok Choi  
**IEEE Transactions on Electron Devices** (IF: 3.221), 64, 10, 4123-4130, 2017
- 8 **(invited) High-efficiency peak-current-control non-inverting buck-boost converter using mode selection for single Ni-MH cell battery operation**  
**Jong-Seok Kim**, Jin-O Yoon, Jaeyun Lee, and Byong-Deok Choi  
**Analog Integrated Circuits and Signal Processing** (IF: 1.321), 89, 2, 297-306, 2016
- 7 **Contact pressure level indication using stepped output tactile sensors**  
Eunsuk Choi, Onejae Sul, Juyoung Kim, Kyumin Kim, **Jong-Seok Kim**, Dae-Yong Kwon, Byong-Deok Choi and Seung-Beck Lee  
**Sensors** (IF: 3.847), 16, 4, 511, 2016
- 6 **High-accuracy, compact scanning method and circuit for resistive sensor arrays**  
**Jong-Seok Kim**, Dae-Yong. Kwon, and Byong-Deok Choi  
**Sensors** (IF: 3.847), 16, 2, 155, 2016

- 5 **A low-power data driving method with enhanced charge sharing technique for large-screen LCD TVs**  
Dong-Un. Kim, **Jong-Seok Kim**, and Byong-Deok Choi  
**Journal of Display Technology** (IF: 1.530), 11, 4, 346–352, 2015
- 4 **A new decoder-type integrated gate driver with a-Si:H TFTs for active-matrix displays**  
**Jong-Seok Kim** and Byong-Deok Choi  
**Japanese Journal of Applied Physics** (IF: 1.384), 53, 3S1, 03CD03, 2013
- 3 **Compact decoder-type gate driver circuits with hydrogenated amorphous silicon thin film transistors for active matrix displays**  
**Jong-Seok Kim**, Gyu-Tae Park, Hyun-Woo Kim, and Byong-Deok Choi  
**Japanese Journal of Applied Physics** (IF: 1.384), 52, 3S, 03BC01, 2012
- 2 **Slew-rate-enhanced rail-to-rail buffer amplifier for TFT LCD data drivers**  
**Jong-Seok Kim**, Jae-Yoon Lee, and B.D. Choi  
**Electronics Letters** (IF: 1.202), 48, 15, 924-925, 2012
- 1 **Image quality enhancement in AMOLED microdisplay for mobile projectors**  
Byong-Deok Choi, In-Su Park, **Jong-Seok Kim**, Sung-Jin Lee, and Byung Seong Bae  
**IEEE Transactions on Consumer Electronics** (IF: 4.414), 57, 2, 313–319, 2011

## **PUBLICATION (CONFERENCE PRESENTATION)**

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- 12 **(invited) Why do the on-silicon displays require small-area driving circuits?**  
**Jong-Seok Kim**  
International Meeting on Information Displays (IMID) 2023, Aug. 2023
- 11 **(invited) Bio-inspired artificial neural tactile sensing system**  
**Jong-Seok Kim**  
Europe-Korea Conference on Science and Technology (EKC) 2022, Marseille, France, Jul. 2022
- 10 **A 1-Tb, 4b/Cell, 176-Stacked-WL 3D-NAND Flash Memory with Improved Read Latency and a 14.8Gb/mm<sup>2</sup> Density**  
W. Cho, J. Jung, J. Kim, J. Ham, S. Lee, Y. Noh, D. Kim, W. Lee, K. Cho, K. Kim, H. Lee, S. Chai, E. Jo, H. Cho, **J-S. Kim**, C. Kwon, C. Park, H. Nam, H. Won, T. Kim, K. Park, S. Oh, J. Ban, J. Park, J. Shin, T. Shin, J. Jang, J. Mun, J. Choi, H. Choi, S-W. Choi, W. Park, D. Yoon, M. Kim, J. Lim, C. An, H. Shim, H. Oh, H. Park, S. Shim, H. Huh, H. Choi, S. Lee, J. Sim, K. Gwon, J. Kim, W. Jeong, J. Choi, K-W. Jin  
IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2022
- 9 **A low-area 10b column driver with resistor-resistor-string DAC for mobile active-matrix LCDs**  
**Jong-Seok Kim**, Jin-O Yoon, and Byong-Deok Choi  
IEEE Asia Pacific Conference on Circuits and Systems (APCCAS), Oct. 2016
- 8 **Low-power counter for column-parallel CMOS image sensors**  
**Jong-Seok Kim**, Jin-O Yoon, and Byong-Deok Choi  
IEEE Asia Pacific Conference on Circuits and Systems (APCCAS), Oct. 2016
- 7 **A decoder-type integrated gate driver with enhanced stability for flexible display using oxide TFTs**  
Chang-Sub Moon, **Jong-Seok Kim**, Yong-Duck Kim, and Byong-Deok Choi  
International Meeting on Information Display (IMID), Aug. 2016
- 6 **High-efficiency peak-current-control non-inverting buck-boost converter using mode selection for single Ni-MH cell battery operation**  
**Jong-Seok Kim**, Jae-Yoon Lee, and Byong-Deok Choi

- 5 **An area-efficient true 10-bit data driver IC for TFT-LCDs**  
Dae-Yong Kwon, Seong-Hoon Rha, **Jong-Seok Kim**, Seong-Kwan Hong, and Byong-Deok Choi  
International Meeting on Information Display (IMID), Aug. 2014
- 4 **A novel 10-bit DAC architecture for compact LCD data driver**  
**Jong-Seok Kim**, Jin-O Yoon, Mi-So Kim, and Byong-Deok Choi  
International Meeting on Information Display (IMID), Aug. 2013
- 3 **A new decoder-type integrated gate driver with a-Si:H TFTs for active matrix displays**  
**Jong-Seok Kim** and Byong-Deok Choi  
International Workshop on Active-Matrix Flatpanel Displays and Devices (AM-FPD), Jul. 2013
- 2 **Enhancement of power saving efficiency of charge sharing methods for large-screen TFT-LCDs**  
Dong-Un Kim, **Jong-Seok Kim**, and Byong-Deok Choi  
International Meeting on Information Display (IMID), Aug. 2013
- 1 **Compact decoder-type gate driver circuits with a-Si TFTs for active matrix displays**  
Hyun-Woo Kim, Gyu-Tae Park, **Jong-Seok Kim**, and Byong-Deok Choi  
International Workshop on Active-Matrix Flatpanel Displays and Devices (AM-FPD), Jul. 2012

## **PUBLICATION (PATENTS)**

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- 18 **디스플레이 구동 회로를 위한 고균일 출력 버퍼**  
**Jong-Seok Kim**, Wiman Yoo  
**KR 10-2023-0194961, Dec. 28, 2023**
- 17 **출력 버퍼의 슬루율 향상 기법을 적용한 디스플레이 구동회로**  
**Jong-Seok Kim**, Wiman Yoo  
KR 10-2023-0189145, Dec. 22, 2023
- 16 **Device for driving resistive element**  
**Jong-Seok Kim**, Jisun Lee  
KR 10-2023-0173326, Dec. 4, 2023
- 15 **Test circuit of semiconductor apparatus and test system including the same**  
**Jong-Seok Kim**  
US 18/174658, Feb. 27, 2023
- 14 **Display device**  
**Jong-Seok Kim**, Bong-Deok Choi, Yong-Duck Kim  
KR 10-2022-0188555, Dec. 29, 2022
- 13 **Current mirror**  
**Jong-Seok Kim**, Bong-Deok Choi, Yong-Duck Kim  
KR 10-2022-0166076, Dec. 1, 2022
- 12 **반도체 장치의 테스트 회로 및 테스트 시스템**  
**Jong-Seok Kim**  
KR 10-2022-0162738, Nov. 29, 2022
- 11 **Semiconductor Device for generating a reference current or voltage in various temperatures**  
**Jong-Seok Kim**  
US 17/830929, June 2, 2022

- 10 **Semiconductor device including charge pump circuit**  
Jong-Seok Kim, Geon-Hwi Lee  
**US 10,873,258, Dec. 22, 2020**
- 9 **Digital counter**  
Byong-Deok Choi, Jong-Seok Kim, Don-Ku Lee  
US 9,479,178, Oct. 25, 2016
- 8 **Digital counter**  
Sung Mook Kim, Byong-Deok Choi, Jong-Seok Kim  
US 9,214,944, Dec. 15, 2015
- 7 **Secure power supply circuit**  
Byong-Deok Choi, Du-Hyun Jeon, Jong-Seok Kim  
KR 10-2238621, Apr. 4, 2021
- 6 **Digital counter**  
Byong-Deok Choi, Jong-Seok Kim, Don Ku Lee  
KR 10-2114906, May 25, 2020
- 5 **Digital counter**  
Sung Mook Kim, Byong-Deok Choi, Jong-Seok Kim  
KR 10-2002466, July 16, 2019
- 4 **Gate driver and driving method thereof**  
Byong-Deok Choi, Jong-Seok Kim  
KR 10-1996893, July 1, 2019
- 3 **Amplifier circuit and driving method thereof**  
Byong-Deok Choi, Jong-Seok Kim  
KR 10-1871491, June 20, 2018
- 2 **Capacitorless low dropout regulator and controlling circuit thereof**  
Byong-Deok Choi, Jong-Seok Kim  
KR 10-1796769, Nov. 6, 2017
- 1 **Switched capacitor amplifier and method for driving thereof**  
Byong-Deok Choi, Jong-Seok Kim  
KR 10-1693111, Dec. 29, 2016

## TEACHING

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### Teaching at Hanyang University ERICA

- System IC – Fall 2023
- Electronic circuit – Fall 2023
- Circuit Theory – Spring 2023
- Computer architecture and operation system – Spring 2023

### Teaching at Gachon University

- P-Project – Fall 2022
- Electronic experiment – Fall 2022
- Analog system design \*including EDA tool (Cadence, Synopsys) education – Fall 2022
- Term project (analog circuit) \*including EDA tool (Cadence, Synopsys) education – Summer 2022
- Analog circuit design \*including EDA tool (Cadence, Synopsys) education – Spring 2022

### Teaching at SK Hynix

- (신입사원 교육) Design of analog circuits for 3D NAND flash memories – Nov. 2021
- (신입사원 교육) Design of high-voltage circuits for 3D NAND flash memories – Nov. 2020

### Teaching at Soongsil University

- Circuits and systems for displays - Spring 2017

#### Teaching at Hanyang University

- Display Driving Circuits - Spring 2015

## AWARDS AND HONORS

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**Education Innovation Award** - Gachon University in July 2022

**Challenging Prize, 24th Human-Tech Paper Awards** - Samsung Electronics in Feb. 2018

**Golden Prize, 2014 Dongbu HiTek IP Design Contest** - Dongbu HiTek in Apr. 2014

**Golden Prize, 2012 Dongbu HiTek IP Design Contest** - Dongbu HiTek in Jul. 2012

**Challenging Prize, KEC Analog Circuit Design Contest** - KEC in Dec. 2010

## INVITED TALKS

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#### Display driving circuit design

Jan. 2024

IC Design Center (IDEC), Ansan, South Korea

#### Bio-inspired artificial neural tactile sensing system

Dec. 2023

Electronics and Telecommunications Research Institute (ETRI), Daejeon, South Korea

#### AR/VR on-silicon micro display driving circuit design

Nov. 2023

Korean Information Display Society (KIDS) workshop, Seoul, South Korea

#### Technical challenges of on-silicon micro display circuits for AR/VR devices (including Apple Vision Pro)

Oct. 2023

6<sup>th</sup> Semiconductor Industry-Academia Exchange Workshop, Seoul, South Korea

#### System Semiconductor Circuit Design and Applications

Sep. 2023

BK REMIX, Ansan, South Korea

#### Why do the on-silicon displays require small-area driving circuits?

Aug. 2023

International Meeting on Information Display (IMID) 2023, Busan, South Korea

#### Introduction of an artificial neural tactile sensing system

July 2023

Summer Conference of the Institute of Semiconductor Engineers 2023, Gyeongju, South Korea

#### Bio-inspired artificial neural tactile sensing system

July 2022

Europe-Korea Conference on Science and Technology (EKC) 2022, Marseille, France

#### Circuit design for AR/VR/MR OLED-on-silicon (OLEDoS) displays

July 2022

Raontech, Seongnam, South Korea

#### Design method for switch-mode power supplies for IoT and automotive applications

Nov. 2017

SK Hynix, Icheon, South Korea