

# 박 준 영 (Jun-Young Park)

School of Electrical Engineering, KAIST  
National NanoFab Center 524, 291 Daehak-ro,  
Yuseong-Gu, Daejeon, Korea 34141  
TEL: +82-42-350-5477  
Mobile: +82-10-6242-6314  
E-mail: [jypark@nobelab.kaist.ac.kr](mailto:jypark@nobelab.kaist.ac.kr)  
**Last Update: Oct. 15, 2018**

## EDUCATION

---

- **B.S.** in Electrical and Electronic Engineering Mar. 2011 – Feb. 2014  
**Yonsei University**, Seoul, South Korea
- **M.S.** in Electrical Engineering (Academic Advisor: Yang-Kyu Choi) Mar. 2014 – Feb. 2016  
**KAIST**, Daejeon, South Korea
- **Ph.D.** in Electrical Engineering (Academic Advisor: Yang-Kyu Choi) Mar. 2016 – Present  
**KAIST**, Daejeon, South Korea

## PROFESSIONAL EXPERTISES

---

- Investigation of Self-Heating Effects in CMOS and Improvement of Reliability
- Thermal Analyses of CMOS through the Characterizations and Simulations
- Ionizing Radiation Effects in CMOS and Improvement of Reliability by Heat Treatment
- Localized Electrothermal Annealing (ETA) for better CMOS Performance and Reliability

## HONORS AND AWARDS

---

- Ph.D. Scholarship Sponsored by the Samsung Electronics Mar. 2017 – Present
- Global Ph.D. Fellowship Sponsored by the NRF of Korea Mar. 2017 – Present
- Top Research Achievement Award in EE at KAIST Apr. 2017
- Excellent Research Achievement Award in EE at KAIST Apr. 2018
- Excellent Startup Award in College of Business at KAIST Jan. 2019

## FUNDING PROJECTS AS A LEADER

---

- Investigation of Vertically Stacked GAA TFET (**Samsung Electronics**) Jul. 2015 – Jul. 2018
- Vertically Stacked GAA FET, 1T-DRAM, and NVM (**Ministry of ICT**) Mar. 2016 – Oct. 2018
- Electronics for Stable Operation in Extreme Environments (**Ministry of Education**) Mar. 2017 – Present
- Permanent Data Erasing Stored in a Flash Memory (**Ministry of Startups**) Jun. 2017 – Oct. 2018
- Development of Equipment to Destroy Flash Memory (**Startup KAIST**) Mar. 2018 – Jan. 2019
- Investigation of Self-Heating Effects in V-NAND Array (**Samsung Electronics**) Mar. 2018 – Present
- Hybrid Hardware Based Nanoscale Security Technology (**Ministry of ICT**) Sep. 2018 – Present

## WORKING EXPERIENCES

---

• Republic of Korea Air Force

Feb. 2010 ~ Mar. 2012

## INTERNATIONAL SCI (E) JOURNALS

---

- [1] **Jun-Young Park**, Dong-Il Moon, Myeong-Lok Seol, Chang-Hoon Jeon, Gwang-Jae Jeon, Jin-Woo Han, Choong-Ki Kim, Sang-Jae Park, Hee Chul Lee, and Yang-Kyu Choi, “Controllable Electrical and Physical Breakdown of Polycrystalline Silicon Nanowires by Thermally Assisted Electromigration”, *Scientific Reports*, vol. 6, no. 19314, Jan. 2016.
- [2] **Jun-Young Park**, Dong-Il Moon, Myeong-Lok Seol, Choong-Ki Kim, Chang-Hoon Jeon, Hagyoul Bae, Tewook Bang, and Yang-Kyu Choi, “Self-Curable Gate-All-Around MOSFETs using Electrical Annealing to Repair Degradation Induced from Hot-Carrier Injection”, *IEEE Trans. Electron Devices*, vol. 63, no. 3, Mar. 2016.
- [3] **Jun-Young Park**, Dong-Il Moon, Hagyoul Bae, Young Tak Roh, Myeong-Lok Seol, Byung-Hyun Lee, Chang-Hoon Jeon, Hee Chul Lee, and Yang-Kyu Choi, “Local Electro-Thermal Annealing for Repair of Total Ionizing Dose Induced Damage in Gate-All-Around MOSFETs”, *IEEE Electron Device Lett.*, vol. 37, no. 7, Jul. 2016.
- [4] **Jun-Young Park**, Hagyoul Bae, Dong-Il Moon, Chang-Hoon Jeon, and Yang-Kyu Choi, “Threshold Voltage Tuning Technique in Gate-All-Around MOSFETs by Utilizing Gate Electrode with Potential Distribution”, *IEEE Electron Device Lett.*, vol. 37, no. 11, Nov. 2016.
- [5] **Jun-Young Park**, Byung-Hyun Lee, Ki Soo Chang, Dong Uk Kim, Chanbae Jeong, Choong-Ki Kim, Hagyoul Bae, and Yang-Kyu Choi, “Investigation of Self-Heating Effects in Gate-All-Around MOSFETs with Vertically Stacked Multiple Silicon Nanowire Channels”, *IEEE Trans. Electron Devices*, vol. 64, no. 11, Nov. 2017.
- [6] **Jun-Young Park**, Jae Hur, and Yang-Kyu Choi, “Demonstration of a Curable Nanowire FinFET using Punchthrough Current to Repair Hot-Carrier Damage”, *IEEE Electron Device Lett.*, vol. 39, no. 2, Feb. 2018.
- [7] **Jun-Young Park**, Byung-Hyun Lee, Geon-Beom Lee, Hagyoul Bae, and Yang-Kyu Choi, “Localized Electrothermal Annealing with Nanowatt Power for a Silicon Nanowire Field-Effect Transistor”, *ACS Appl. Mater. Interfaces*, vol. 10, no. 5, Feb. 2018.
- [8] **Jun-Young Park**, Dong-Il Moon, Seong-Yeon Kim, Hwon Im, Ki Soo Chang, Chanbae Jeong, and Yang-Kyu Choi, “Sanitization of Data in Nanoscale Flash Memory by Thermal Erasing and Reuse of Storage”, *Phys. Status Solidi A-Appl. Mater.*, vol. 215, no. 14, Apr. 2018. (Selected as a Front Cover)
- [9] **Jun-Young Park**, Weon-Guk Kim, Hagyoul Bae, Ik Kyeong Jin, Da-Jin Kim, Hwon Im, Il-Woong Tcho, and Yang-Kyu Choi, “On-Chip Curing by Microwave for Long Term Usage of Electronic Devices in Harsh Environments”, *Scientific Reports*, in press.
- [10] Joon-Kyu Han, **Jun-Young Park (equally contributed)**, and Yang-Kyu Choi, “Power Reduction for Recovery of a FinFET by Electrothermal Annealing”, *Solid-State Electron.*, in press.
- [11] Byung-Hyun Lee, Min-Ho Kang, Dae-Chul Ahn, **Jun-Young Park**, Tewook Bang, Seung-Bae Jeon, Jae Hur, Dongil Lee, and Yang-Kyu Choi, “Vertically Integrated Multiple Nanowire Field Effect Transistor”, *Nano Lett.*, vol. 15, no. 12, Nov. 2015. (Reported in Domestic Media)
- [12] Dae-Chul Ahn, Myeong-Lok Seol, Jae Hur, Dong-Il Moon, Byung-Hyun Lee, Jin-Woo Han, **Jun-Young Park**, Seung-Bae Jeon, and Yang-Kyu Choi, “Ultra-Fast Erase Method of SONOS Flash Memory by Instantaneous Thermal Excitation”, *IEEE Electron Device Lett.*, vol. 37, no. 2, Feb. 2016.
- [13] Chang-Hoon Jeon, **Jun-Young Park**, Myeong-Lok Seol, Dong-Il Moon, Jae Hur, Hagyoul Bae, Seung-Bae Jeon, and Yang-Kyu Choi, “Joule Heating to Enhance the Performance of a Gate-All-Around Silicon Nanowire Transistor”, *IEEE Trans. Electron Devices*, vol. 63, no. 6, Feb. 2016.

- [14] Choong-Ki Kim, Eungtaek Kim (equally contributed), Myung Keun Lee, **Jun-Young Park**, Myeong-Lok Seol, Hagyoul Bae, Tewook Bang, Seung-Bae Jeon, Sungwoo Jun, Sang-Hee Park, Kyung Cheol Choi, and Yang-Kyu Choi, "An Electro-Thermal Annealing (ETA) Method to Enhance the Electrical Performance of Amorphous-Oxide-Semiconductor (AOS) Thin-Film Transistors (TFTs)", *ACS Appl. Mater. Interfaces*, vol. 8, no. 36, Aug. 2016.
- [15] Dongil Lee, Byung-Hyun Lee (equally contributed), Jinsu Yoon, Dae-Chul Ahn, **Jun-Young Park**, Jae Hur, Myeong-Soo Kim, Seung-Bae Jeon, Min-Ho Kang, Kwanghee Kim, Meehyun Lim, Sung-Jin Choi, and Yang-Kyu Choi, "Three-Dimensional Fin-Structured Semiconducting Carbon Nanotube Network Transistor", *ACS Nano*, vol. 10, no. 12, Nov. 2016. (Reported in Domestic Media)
- [16] Hagyoul Bae, Byung-Hyun Lee (equally contributed), Dongil Lee, Myeong-Lok Seol, Daewon Kim, Jin-Woo Han, Choong-Ki Kim, Seung-Bae Jeon, Dae-Chul Ahn, Sang-Jae Park, **Jun-Young Park**, and Yang-Kyu Choi, "Physically Transient Memory on a Rapidly Dissoluble Paper for Security Application", *Scientific Reports*, vol. 6, no. 38324, Dec. 2016. (Reported in Domestic Media)
- [17] Hagyoul Bae, Tewook Bang, Choong-Ki Kim, Jae Hur, Seyeob Kim, Chang-Hoon Jeon, **Jun-Young Park**, Dae-Chul Ahn, Gun-Hee Kim, Yunik Son, Jae-Hoon Lee, Yong-Taik Kim, Seong-Wan Ryu, and Yang-Kyu Choi, "Improved Technique for Extraction of Effective Mobility by Considering Gate Bias-Dependent Inversion Charges in a Floating-Body Si/SiGe pMOSFET", *J. Nanosci. Nanotechnol.*, vol. 17, no. 5, May 2017.
- [18] Myung Keun Lee, Choong-Ki Kim (equally contributed), Eungtaek Kim, Jeong Woo Park, Myeong-Lok Seol, **Jun-Young Park**, Yang-Kyu Choi, Sang-Hee Ko Park, and Kyung Cheol Choi, "Electro-Thermal Annealing Method for Recovery of Cyclic Bending Stress in Flexible a-IGZO TFTs", *IEEE Trans. Electron Devices*, vol. 64, no. 8, Aug. 2017.
- [19] Geon-Beom Lee, Choong-Ki Kim, **Jun-Young Park**, Tewook Bang, Hagyoul Bae, Seong-Yeon Kim, Seung-Wan Ryu, and Yang-Kyu Choi, "A Novel Technique for Curing Hot-Carrier-Induced Damage by Utilizing the Forward Current of the PN-Junction in a MOSFET", *IEEE Electron Device Lett.*, vol. 38, no. 8, Aug. 2017.
- [20] Hagyoul Bae, Byung Chul Jang (equally contributed), Hongkeun Park, Soo-Ho Jung, Hye Moon Lee, **Jun-Young Park**, Seung-Bae Jeon, Gyeongho Son, Kyoungsik Yu, Sung-Gap Im, Sung-Yool Choi, and Yang-Kyu Choi, "Functional Circuitry on Commercial Fabric via Textile-Compatible Nanoscale Film Coating Process for Fibertronics", *Nano Lett.*, vol. 17, no. 10, Sep. 2017. (Reported in Domestic Media)
- [21] Chang-Hoon Jeon, Choong-Ki Kim (equally contributed), **Jun-Young Park**, Ui-Sik Jeong, Byung-Hyun Lee, Kyung Rok Kim, and Yang-Kyu Choi, "LF Noise Analysis for Trap Recovery in Gate Oxides Using Built-in Joule Heater", *IEEE Trans. Electron Devices*, vol. 64, no. 12, Dec. 2017.
- [22] Kyu-Man Hwang, **Jun-Young Park**, Hagyoul Bae, Seung-Wook Lee, Choong-Ki Kim, Myungsoo Seo, Hwon Im, Do-Hyun Kim, Seong-Yeon Kim, Geon-Beom Lee, and Yang-Kyu Choi, "A Nano-Electro Mechanical Switch Based on a Physical Unclonable Function for Highly Robust and Stable Performance in Harsh Environments", *ACS Nano*, vol. 11, no. 12, Dec. 2017. (Reported in International Media)
- [23] Seong-Yeon Kim, Byung-Hyun Lee, Jae Hur, **Jun-Young Park**, Seung-Bae Jeon, Seung-Wook Lee, and Yang-Kyu Choi, "A Comparative Study on Hot-Carrier Injection in 5-Story Vertically Integrated GAA MOSFETs", *IEEE Electron Device Lett.*, vol. 39, no. 1, Jan. 2018.
- [24] Ik Kyeong Jin, **Jun-Young Park**, Byung-Hyun Lee, Seung-Bae Jeon, Il-Woong Tcho, Sang-Jae Park, Weon-Guk Kim, Joon-Kyu Han, Seung-Wook Lee, Seong-Yeon Kim, Hagyoul Bae, Daewon Kim, Yang-Kyu Choi, "Self-Powered Data Erasing of Nanoscale Flash Memory by Triboelectricity", *Nano Energy*, vol. 52, Oct. 2018. (Reported in Domestic Media)
- [25] Joon-Kyu Han, **Jun-Young Park**, Choong-Ki Kim, Jeong Hyun Kwon, Myeong-Soo Kim, Byeong-Woon Hwang, Da-Jin Kim, Kyung Cheol Choi, and Yang-Kyu Choi, "Electrothermal Annealing to Enhance the Electrical Performance of an Exfoliated MoS<sub>2</sub> Field-Effect Transistor", *IEEE Electron Device Lett.*, vol. 39, no. 10, Oct. 2018.

[26] Jae Hur, Byung Chul Jang, Jihun Park, Dong-Il Moon, Hagyoul Bae, **Jun-Young Park**, Gun-Hee Kim, Seung-Bae Jeon, Myungsoo Seo, Sungho Kim, Sung-Yool Choi, and Yang-Kyu Choi, “A recoverable synapse device using a three-dimensional silicon transistor”, *Adv. Func. Mater.*, in press.

## CONFERENCES

---

[1] **Jun-Young Park**, “Self-Repairable MOSFETs using Electrothermal Annealing to Improve the Device Reliability”, in *Korea Global Ph.D. Fellows Annual Conference*, Dec. 2017.

[2] Tewook Bang, Hagyoul Bae, Choong-Ki Kim, Jae Hur, **Jun-Young Park**, Dae-Chul Ahn, Gun-Hee Kim, Yun-Ik Son, Jae-Hoon Lee, Yong-Taik Kim, and Yang-Kyu Choi, “Improved Split C-V Technique for Accurate Extraction of Mobility by Considering Effective Inversion Charges in p-Channel SiGe MOSFET”, in *Proc. 23th Korean Conference on Semiconductors*, Feb. 2016.

[3] Byung-Hyun Lee, Dae-Chul Ahn, Min-Ho Kang, Seung-Bae Jeon, Tewook Bang, Hagyoul Bae, **Jun-Young Park**, Dae-Won Hong, Nam-Soo Park, and Yang-Kyu Choi, “Vertically Integrated ZRAM Toward Extremely Scaled Memory”, in *Proc. 230th ECS Meeting*, Oct. 2016.

[4] Dong-Il Moon, **Jun-Young Park**, Jin-Woo Han, Gwang-Jae Jeon, Jee-Yeon Kim, Joon-Bae Moon, Myeong-Lok Seol, Choong-Ki Kim, Hee Chul Lee, Meyya Meyyappan, and Yang-Kyu Choi, “Sustainable Electronics for Nano-Spacecraft in Deep Space Missions”, in *Proc. IEEE Int. Electron Devices Meeting (IEDM)*, Dec. 2016. (**Reported in International Media**)

[5] Dongil Lee, Byung-Hyun Lee, Jinsu Yoon, Bongsik Choi, **Jun-Young Park**, Dae-Chul Ahn, Choong-Ki Kim, Byeong-Woon Hwang, Seung-Bae Jeon, Hyun Jun Ahn, Myeong-Lok Seol, Min-Ho Kang, Byung-Jin Cho, Sung-Jin Choi, and Yang-Kyu Choi, “First Demonstration of a Wrap-Gated CNT-FET with Vertically-Suspended Channels”, in *Proc. IEEE Int. Electron Devices Meeting (IEDM)*, Dec. 2016.

[6] Ik Kyeong Jin, Hagyoul Bae, **Jun-Young Park**, Choong-Ki Kim, Yun-Ik Son, Jae-Hoon Lee, Yong-Taik Kim, Seong-Wan Ryu, and Yang-Kyu Choi, “A Study of Radiation Resistance and Wafer-Scale Restoration via Interface Trap Behavior in SiGe pMOSFET,” in *Proc. 25th Korean Conference on Semiconductors*, Feb. 2018. (Selected as the Best Paper in the Session)

[7] Joon-Kyu Han, **Jun-Young Park**, and Yang-Kyu Choi, “Investigation of Electrothermal Annealing to Repair the Hot-Carrier Degradation in a Tri-Gate FinFET” in *Proc. 25th Korean Conference on Semiconductors*, Feb. 2018.

## PATENTS

---

[1] **Jun-Young Park**, “Liquid Crystal Display”, **KR** (10-1406290).

[2] **Jun-Young Park**, Dong-Il Moon, and Yang-Kyu Choi, “Hardware Based Security Apparatus and Security Method Using the Same”, **US** (15/007,630), **KR** (10-1678619).

[3] **Jun-Young Park** and Yang-Kyu Choi, “Hardware-Based Security Device with Physical and Permanent Destruction, and Security Method Using the Same”, **KR** (10-1801547).

[4] **Jun-Young Park**, Byung-Hyun Lee, Dae-Chul Ahn, and Yang-Kyu Choi, “Multi Bit Capacitorless DRAM and Manufacturing Method Thereof”, **KR** (10-1835612).

[5] **Jun-Young Park**, Byung-Hyun Lee, and Yang-Kyu Choi, “Multi Bit Capacitorless DRAM Using Band Offset Technology and Manufacturing Method Thereof”, **US** (9,728,539), **KR** (10-1835611).

[6] **Jun-Young Park** and Yang-Kyu Choi, “Tunneling Field-Effect Transistors with a Plurality of Nano-Wires and Fabrication Method Thereof”, **US** (9,997,596), **KR** (10-13838913).

- [7] **Jun-Young Park** and Yang-Kyu Choi, “Field Effect Transistor Capable of Self-Repairing Radiation Damage and Damage Repairing System Thereof”, **PCT** (PCT/KR2016/014134), **KR** (10-1801548).
- [8] **Jun-Young Park**, Chang-Hoon Jeon, Hagyoul Bae, Geon-Beom Lee, and Yang-Kyu Choi, “Field-Effect Transistor Controlling Apparatus Being Capable of Controlling Threshold Voltage”, **KR** (10-1835613).
- [9] **Jun-Young Park**, Chang-Hoon Jeon, Geon-Beom Lee, and Yang-Kyu Choi, “Multi Bit Field-Effect Transistor and Its Controlling Apparatus”, **KR** (10-1838279).
- [10] **Jun-Young Park**, Chang-Hoon Jeon, and Yang-Kyu Choi, “The Method for Enhancing the Driving Current of Junctionless Transistor”, **US** (10,084,128), **KR** (10-1852424).
- [11] **Jun-Young Park** and Yang-Kyu Choi, “The Method for Fabricating a Tunneling Field Effect Transistor and Improving of the Drive Current in Tunneling Field Effect Transistor Utilizing Ultra-Low Power Electro-Thermal Local Annealing”, **PCT** (PCT/KR2017/014455), **KR** (10-13838910).
- [12] **Jun-Young Park** and Yang-Kyu Choi, “Hardware-Based Security Device and Method that Enables Permanent Data Erase and Reuse of Storage in Flash Memory”, **KR** (10-2017-0066481).
- [13] **Jun-Young Park** and Yang-Kyu Choi, “Thermal Hardware-Based Security Device and Method that Permanently Erase Data Using Localized Heat Phenomenon”, **KR** (10-2017-0088372). (**Selected as a Top 10 Patent at KAIST**)
- [14] **Jun-Young Park** and Yang-Kyu Choi, “Self-Repairable Electronic Device and Self-Repairing Method for Semiconductor Chip Using the Same”, **KR** (10-2017-0124855).
- [15] **Jun-Young Park** and Yang-Kyu Choi, “Self-Destructible Flash Memory Chip and Method for Permanently Erase Data Thereof”, **KR** (10-2018-0007510).
- [16] **Jun-Young Park** and Yang-Kyu Choi, “Thermal Hardware-Based Data Security Device that Permanently Erases Data by Using Local Heat Generation Phenomenon and Method Thereof”, **US** (16/032,630), **KR** (10-2018-0018003). (**Selected as a Top 10 Patent at KAIST**)
- [17] **Jun-Young Park**, Jae Hur, and Yang-Kyu Choi, “The Local Thermal Annealing Method for Curing of Gate Oxide Damage Utilizing Punchthrough Current in MOSFET”, **KR** (10-2018-0044236).
- [18] **Jun-Young Park** and Yang-Kyu Choi, “Vertically Integrated 3-Dimensional Flash Memory for High Reliable Flash Memory and Fabrication Method Thereof”, **KR** (10-2018-0070793).
- [19] **Jun-Young Park** and Yang-Kyu Choi, “Fabrication of Flexible Material for Efficient Heat Dissipation of Chip and Cooling Method Thereof”, **KR** (10-2018-0084206).
- [20] **Jun-Young Park**, Sung-Hwan Kim, Jun-Woo Son, Joon-Kyu Han, and Yang-Kyu Choi, “Method and Apparatus for Permanently Destroying Data”, **KR** (10-2018-0099136).
- [21] **Jun-Young Park** and Yang-Kyu Choi, “Vertically Integrated 3-Dimensional Flash Memory for High Reliable Flash Memory and Fabrication Method Thereof”, **PCT** (PCT/KR2018/010880), **KR** (10-2018-0109513).
- [22] Daewon Kim, Seung-Bae Jeon, **Jun-Young Park**, and Yang-Kyu Choi, “Cylindrical Triboelectric Generator Based on Contact-Electrification”, **KR** (10-1617865).
- [23] Dae-Chul Ahn, Jae Hur, **Jun-Young Park**, Dong-Il Moon, and Yang-Kyu Choi, “Memory Device of Supporting Fast Operation Speed and Self-Healing”, **KR** (10-1731183).
- [24] Choong-Ki Kim, Hagyoul Bae, **Jun-Young Park**, and Yang-Kyu Choi, “Method for Recovering Damage of Transistor and Display Apparatus Using the Same”, **KR** (10-1905445).
- [25] Geon-Beom Lee, **Jun-Young Park**, Choong-Ki Kim, Hagyoul Bae, and Yang-Kyu Choi, “The Local Annealing Method for Curing of Gate Oxide Damage Utilizing Forward Bias Current in MOSFET”, **PCT** (PCT/KR2017/009588), **KR** (10-13838912).
- [26] Hagyoul Bae, **Jun-Young Park**, and Yang-Kyu Choi, “The Vertical-Type Gateless and Capacitorless DRAM Cell Based on Germanium and the Method for Manufacturing Thereof”, **KR** (10-2017-0089041).

- [27] Hagyoul Bae, **Jun-Young Park**, and Yang-Kyu Choi, “The Vertical-Type Gateless and Capacitorless DRAM Cell Based on Germanium and the Method for Manufacturing Thereof”, **EP** (18183260.1), **KR** (10-2018-0001459).
- [28] Joon-Kyu Han, **Jun-Young Park**, Choong-Ki Kim, and Yang-Kyu Choi, “A Annealing Method for Enhancing Driving Current of Transistor Using Localized Heat”, **KR** (10-2018-0083226).

## REFERENCES

---

**Prof. Yang-Kyu Choi** (Academic Advisor)

School of Electrical Engineering, KAIST

291 daehak-ro, yuseong-gu, Daejeon, Korea 34141

E-mail: [ykchoi@ee.kaist.ac.kr](mailto:ykchoi@ee.kaist.ac.kr)

Tel: +82-42-350-3477