

## Hassan Saif

PEC: ELECT/ 35814; CV updated: 16 Sept, 2021

### SHORT BIOGRAPHY

Hassan Saif received his B.S. degree in electrical engineering from the University of Engineering and Technology, Lahore, Pakistan, and the M.S leading to Ph.D. in electronics engineering from Sungkyunkwan University, South Korea, in 2012 and 2020 respectively. He has been involved in a number of research and industrial projects. His current research interests include power management circuits, harvesting interface, DC-DC converters, switched capacitor networks, and low power electronics.

### RESEARCH INTERESTS

Switched Capacitor Networks, Power Management Circuits, DC-DC Converters, VLSI Design, RTL Design Synthesis Digital Integrated Circuits Design, Ultra-Low Power Processor Design, Ultra-Low Power AFE, Analog & Mixed Circuit IC Design, Bio-Medical Electronics, and Low Power Circuits.

### EDUCATION

**M.S leading to Ph.D.** in Electronics and Electrical Engineering, Sungkyunkwan University, South Korea, Feb 2020

**Dissertation:** *Design of Wide Voltage and Current Range Energy Harvesting and Power Management Circuits for IoT Systems*

**GPA:** 4.3/4.5

**BSc** in Electrical Engineering, UET, Lahore, Pakistan, 2012

**Final Year Project:** Implementation of 300V variable DC-DC Converter for Motor Drive Control

**GPA:** 3.6/4.0

### TEACHING EXPERIENCE

- **Assistant Professor**, EE Department, FAST-NU, Islamabad, Pakistan **May 2020 – to date**  
**Undergraduate Taught Courses:** Electronic Circuits-I, Electronic Circuits-II, VLSI Design  
**Graduate Taught Courses:** Digital Integrated Circuits Design, Mixed Signal IC Design, VLSI RTL Design Synthesis

#### **Supervised/Co-supervised IC Taped-out Graduate Projects/Thesis:**

- CMOS Approximate ALU Design and Implementation by RTL Synthesis
- CMOS Radiation Hardened CLB Design and Implementation by RTL Synthesis
- On-Chip Sigma-Delta Modulator
- On-Chip Successive Approximation (SAR) ADC
- Bi-directional On-Chip Control and Drivers Triboelectric Harvesting Interface System
- Curvature Compensated CMOS Bandgap Reference Circuit
- CMOS AC Logic Family Design and Implementation

**Achievements:** Three graduate student project proposals selected for Solid State Circuit Society (SSCS) Platform for IC Design Outreach (PICO) October 2021 Tapeout Shuttle

### INDUSTRIAL EXPERIENCE

Newage Cables Private Limited, Lahore (**Nov 2012 – Feb 2015**)

Joined as "Quality Control Engineer", then promoted to "Assistant Manager Production".

Task Description (Quality Control Engineer)

- Supervise cables and conductors testing according to IEC and WAPDA specifications.
- Assist Quality Control Manager during external party inspection and testing.
- Sampling and testing of in-process items, to ensure compliance to the target specification.
- Conduct training sessions according to ISO standards.

Task Description (Assistant Manager Production)

- Preparation of technical Job cards according to the technical specification of cables/ conductors.
- Prioritize orders according to specified timelines.

**ASSISTANT MANAGER  
PRODUCTION  
2 YEARS & 4 MONTHS**

- Scheduling of Preventive & corrective maintenance work.
- Test reports checking to analyze and reduce failures.
- Analyze monthly production report of machines and provide proposals to improve efficiency.

## JOURNAL PUBLICATIONS

1. **Hassan Saif**, Yongmin Lee, Hyeonji Lee, Minsun Kim, Muhammad Bilawal Khan, Jung-Hoon Chun and Yoonmyung Lee. "A Wide Load Current and Voltage Range Switched Capacitor DC–DC Converter with Load Dependent Configurability for Dynamic Voltage Implementation in Miniature Sensors". *Energies* 2018, 11(11), 3092; 08 Nov 2018. (**JCR I. F 2.707**)
2. M. B. Khan, D .H. Kim, J. H. Han, **H. Saif**, H. Lee, Y. Lee, M. Kim, E. Jang, S.K. Hong et.al. "Performance improvement of flexible piezoelectric energy harvester for irregular human motion with energy extraction enhancement circuit". *Nano Energy*. Vol: 58, pp : 211-219, Apr 2019. (**JCR I. F 15.548**)
3. **Hassan Saif**, Muhammad Bilawal Khan, Jongmin Lee, Kyoungcho Lee and Yoonmyung Lee. "A High-Voltage Energy-Harvesting Interface for Irregular Kinetic Energy Harvesting in IoT Systems with 1365% Improvement Using All-NMOS Power Switches and Ultra-low Quiescent Current Controller". *Sensors* 2019, 19(17), 3685; 24 Aug 2019. (**JCR I. F 3.076**)
4. Muhammad Bilawal Khan, **Hassan Saif**, and Yoonmyung Lee, "A Piezoelectric Harvesting Interface with Capacitive Partial Electric Charge Extraction for Energy Harvesting from Irregular High-Voltage Input", *Energies* 2018, 13(8), 1939; 15 Apr 2020. (**JCR I. F 2.707**)
5. M.B. Khan, D. H. Kim, J. H. Han, **H. Saif**, et al. "A Harvesting Circuit for Flexible Thin Film Piezoelectric Generator Achieving 562% Energy Extraction Improvement with Load Screening", *IEEE Trans. Industrial Electronics*, (Early Access), 2020. (**JCR I. F 7.515**)
6. J. Yousaf, W. Nah, E. R. Al Majali, **H. Saif**, H.Rmili, "Rapid characterization of efficient system level ESD protection strategy using coupling transfer function", *Elsevier Microelectronics Journal*, Volume 110, 2021. (**JCR I.F 1.405**)
7. M.B. Khan.; **H. Saif**; K. Lee; Y. Lee, "Dual Piezoelectric Energy Investing and Harvesting Interface for High-Voltage Input", *Sensors* 2021, 21, 2357. (**JCR I. F 3.275**)

## SOUTH KOREAN PATENTS

1. Y. Lee, G. C. Shin, and **H. Saif**, "Module of voltage attenuation and the apparatus and the method for attenuating voltage", South Korea Patent Office, Application No. 1020180141919, 16 Nov, 2018.
2. Y. Lee, H. Lee, E. Jang, and **H. Saif**, "Module of voltage amplifier and method and apparatus for amplifying voltage", South Korea Patent Office, Application No. 1020180007727, 22 Jan, 2018.
3. Y. Lee, **H. Saif**, and Y. Yoon, "AN ELECTRONIC DEVICE INCLUDING A HARVEST CIRCUIT BEING INPUT APERIODIC SIGNAL", South Korea Patent Office, Application No. 1020190110129, 05 Sep, 2019.

## PEER REVIEWED CONFERENCE PUBLICATIONS

PUBLISHED IN TOP RANK INTEGRATED CIRCUITS (IC) DESIGN CONFERENCES

1. **Hassan Saif**, Y Lee, M Kim, H Lee, MB Khan, Yoonmyung Lee. "A wide load and voltage range switched-capacitor DC-DC converter with load-dependent configurability for DVS implementation in miniature sensors". *IEEE Asian Solid-State Circuits Conference (A-SSCC)*, Nov. 2017, Seoul, South Korea.
2. H Lee, E Jang, **H Saif**, Y Lee, M Kim, MB Khan, Yoonmyung Lee. "A Sub-nW Fully Integrated Switched-Capacitor Energy Harvester for Implantable Applications". *IEEE European Solid State Circuits Conference (ESSCIRC)*, Sept. 2018, Dresden, Germany.
3. **Hassan Saif**, MB Khan, Yoonmyung Lee. "A 17V-to-45V Input 25 $\mu$ W-to-10mW Output Power, 90.2%-Peak-Efficiency SC DC-DC Converter with Recursive Output Connection for High-Voltage Energy Harvesting". *IEEE Custom Integrated Circuits Conference (CICC)*, Apr. 2019, Texas, USA.
4. Muhammad Bilawal Khan, **Hassan Saif**, Yoonmyung Lee. "Flexible Thin Film Piezoelectric Energy Harvester with 0.38nA Quiescent Current and up to 562% Energy Extraction

improvement with Load Hiding for Powering Wearable Electronics with Irregular Human Motion” IEEE Asian Solid-State Circuits Conference (A-SSCC), Nov. 2019, Macau.

## **TOOLS, PACKAGES & LANGUAGES**

- Cadence Tools Suite (Virtuoso, etc.) for Analog & Mixed Signal IC design
- Synopsis Tool Suite for Analog & Mixed Signal IC design
- Verilog and VHDL for digital ASIC design
- RTL Design Synthesis with Cadence Tool Suite
- RTL Design Synthesis with Synopsis Tool Suite
- Top Level IC Integration, PAD Frame Design, Design Verification, and Signoff
- Orcad and Allegro for PCB design
- Labview for IC Testing Setup
- Matlab for Simulation and Modeling at System Level
- MS-Office
- MS Visio
- Origin

## **PROCESS DEVELOPMENT KITS (PDK's) EXPERTISE**

- TSMC 180nm Typical (Low) Voltage PDK
- TSMC 180nm Typical (Low) Voltage PDK
- Samsung 28nm Typical (Low) Voltage
- Magnachip 350nm High Voltage/Low Voltage PDK
- Nuvoton 350nm High Voltage/Low Voltage PDK

## **REFERENCES**

- Prof. Dr. Yoonmyung Lee, Associate Professor Department of Electrical and Computer Engineering, Sungkyunkwan University, South Korea  
(Office: +82-31-290-7979, [yunmyung@skku.edu](mailto:yunmyung@skku.edu) )
- Prof. Dr. Jung-Hoon Chun, Associate Professor Department of Electrical and Computer Engineering, Sungkyunkwan University, South Korea  
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- Prof. Dr. Jae-Hyuk Choi, Associate Professor Department of Semiconductor Systems Engineering, Sungkyunkwan University, South Korea  
(Office: +82-31-290-7979, [choi215@skku.edu](mailto:choi215@skku.edu) )
- Dr. Kyoungho Lee, Principle Researcher, Korea Electrotechnology Research Institute  
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