

## DO QUANG HUY

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## EDUCATION

### **Kyung Hee University**

Ph.D. in Electronic Engineering

Advisor: Prof. Yoon Sang Woong

Thesis: High Isolation Phase Conjugator and Wideband CMOS Circulator IC for Retrodirective Wireless Power Transfer System.

GPA: 4.0/4.3

Yongin, South Korea  
*Spring 2021 – Spring 2026*

### **Hanoi University of Science and Technology**

B.E. in Mechatronics Engineering

Advisor: Prof. Vu Toan Thang

Thesis: Design of an Automatic Balancing System for a Lift-Assist Manipulator.

GPA: 3.2/4.0

Hanoi, Vietnam  
*Fall 2015 – Fall 2020*

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## SKILLS SUMMARY

- **Technical** : RF/Analog Design, IC Layout, EM Simulation, PCB Design.
  - **CAD Tools** : Cadence, Calibre, SpectreRF, ADS, HFSS, SiWave, Altium
  - **Programming** : C/C#/C++, Python, Shell.
  - **Lab Skills** : Spectrum/Network Analyzer, Signal Generator, Probe Station, Noise Analyzer, Laser Trimming.
  - **Soft Skills** : People Management, Scientific Writing, Collaboration.
  - **Language** : IELTS 7.0.
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## WORK EXPERIENCE

### **Graduate Researcher | Kyung Hee University (Full Time)**

Yongin, South Korea  
*2021.03 – present*

#### RF/Analog IC Design & Tape-Out:

- Design RF/Analog front-end circuits (LNAs, DAs, mixers, VCOs, circulators...) and contributed to system architecture for intelligent wireless power transfer.
- Perform schematic design, simulation, layout, and full verification flow (DRC, LVS, PEX).
- Conduct EM simulations (HFSS, Siwave) for on-chip passives and RF structures and prepar design DB for tape-out.

#### Prototyping, PCB & Testing:

- Develop test plans, design PCB test benches performed functional, RF, and system-level measurements.

- Experience with lab equipments: VNAs, spectrum analyzers, oscilloscopes, signal generators, probe stations, laser trimming.
- Debug and optimize designs based on measurement results.

Documentation & Publication:

- Write and contribute to project proposals and research reports.
- Prepare scientific manuscripts, conference papers, and presentations.
- Generate and maintain design documentation including schematics, specs, measurement logs, and test reports.

Collaboration & Mentoring:

- Mentor undergraduate and graduate students in RFIC design, measurement techniques, and Cadence workflow.

**Hardware Engineer | Vietmani JSC  
(Full Time)**

Hanoi, Vietnam  
2018.04 – 2019.08

Control & Embedded Systems:

- Design feedback-control system for lift-assisted manipulator.
- Microcontroller programming (AVR, ARM).

Mechanical & Structural Design:

- 3D modeling and assembly (Inventor, NX, AutoCAD).
- FEA simulation for force, stress, and bending analysis.

Prototyping & Testing:

- Design control board, integrate with prototype manipulator.
- Calibration of sensors and actuators.

Documentation & Collaboration:

- Create schematics, wiring diagrams.
- Write manuals, test reports, design documentation.

**Hardware Engineer | BKAPEMA Co. Ltd.  
(Intern)**

Hanoi, Vietnam  
2018.04 – 2019.08

Control & Automation Systems:

- PLC programming (Siemens, Mitsubishi, Delta).
- HMI design for machine control and monitoring.

Electrical System & Sensor Integration:

- Integration of sensors (proximity, pressure, temperature, limit sensors).
- Relay control, contactors, starters, and circuit protection devices.
- Motor and actuator control (DC, BLDC, servo, pneumatic/hydraulic).

Documentation & Collaboration:

- Create wiring diagrams, I/O lists, and control flow documentation.
- User manuals and operation guides for HMI/PLC systems.
- Collaboration with mechanical teams to ensure system compatibility.

**Hardware Engineer | SELEX Motors JSC  
(Intern)**

Hanoi, Vietnam  
2017.06 – 2018.12

Electronics Circuit & PCB Design:

- Schematic design of Battery Management System (BMS) circuit incorporating MCUs, power management circuitry, opto-electrical components, sensors, and analog/mixed-signal components under supervision.

Prototyping & Testing:

- Participate in the development and execution of test plans, building and validating BMS prototype.

Cross-Team Collaboration:

- Work with Mechanical Team for electronics-mechanics integration (connector placement, mechanical constraints).
- Work with Embedded Team to define hardware–firmware interfaces.

Component Selection & BOM Management:

- Evaluate and select components based on availability, cost, and lifecycle.
- Create and maintain Bill of Materials (BOM)

## PROJECTS

### **IR Receiver Based on Staggered Communication** 2025.05 – present

*Main Researcher*

- Studied staggered commutation techniques for intrinsic image rejection without conventional quadrature mixing.
- Designed and simulated a prototype receiver to evaluate conversion gain, image suppression, noise and linearity performance.

### **High Isolation Phase Conjugator and Wideband Circulator** 2023.03 – 2025.03

#### **IC for Retrodirective Wireless Power Transfer System**

*Main Researcher*

- Proposed self-interference cancellation (SIC) technique to enhance retro-directivity in wireless power transfer.
- Designed a phase conjugator by integrating SIC with a Gilbert-cell mixer.
- Studied configurations of N-path commutated network-based circulator to improve TX-RX isolation and transmission performance.
- Proposed a novel use of non-Foster elements to widen isolation bandwidth.
- Designed a 2.4 GHz magnetic-free circulator.
- Tape-out completed with Samsung 28nm RF CMOS.
- Phase-conjugator's measurement showed state-of-the-art isolation performance, and fabricated circulator achieved 25% fractional bandwidth.

### **Retro-directive RF SoC with Magnetic-free Circulator** 2022.01 – 2023.01

*Main Researcher*

- Conducted research on magnetic-free circulator for integration in full-duplex communication.
- Designed a fully integrated CMOS circulator including N-path filter-based gyrator and 4-phase clock generator.
- Proposed a negative capacitor (NCAP) delay line to cancel PGD generated gyrator for bandwidth extending
- Tape-out completed with Samsung 28nm RF CMOS.
- Fabricated circulator had a bandwidth of 65MHz, 13 times greater than that of narrowband counterpart.

### **RFIC Design for Retro-directive Beamforming** 2021.04 – 2021.12

*Research Assistant*

- Studied IC design flow and linux-based system management.

- Designed RFIC blocks: Low-noise amplifier (LNA) and drive amplifier (DA).
- Tape-out completed with Samsung 65nm RF CMOS.

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## PUBLICATION LIST

- **Q. -H. Do**, D. -N. Pham, and S. -W. Yoon, "Wideband CMOS Circulator IC using Non-Foster Elements," (in preparation for *IEEE Transactions on Microwave Theory and Techniques*)
- **Q. -H. Do**, D. -N. Pham and S. -W. Yoon, "Isolation-Enhanced Phase Conjugator Design for Retro-Directive Wireless Power Transfer System," in *IEEE Microwave and Wireless Technology Letters*, doi: 10.1109/LMWT.2025.3597259.
- **Q. -H. Do**, T. -B. Ngo, and S. -W. Yoon, "An Ultra-compact Fully Integrated Circulator in 28 nm CMOS IC Technology," *Journal of Semiconductor Technology and Science*, doi: 10.5573/JSTS.2025.25.2.184.
- **Q. -H. Do**, T. -B. Ngo, and S. -W. Yoon, "A CMOS Low-pass Filter with Group Delay Cancellation using Non-Foster Element Circuits," *Journal of Semiconductor Technology and Science*, doi: 10.5573/JSTS.2024.24.2.105.
- T. -B. Ngo, **Q. -H. Do**, and S. -W. Yoon, "Leakage Power Canceling Module with a Negative Capacitor for a Circulator's Isolation," *Journal of Electromagnetic Engineering and Science*, doi: 10.26866/jees.2023.2.r.151.
- T. -B. Ngo, **Q. -H. Do**, and S. -W. Yoon, "A Wideband Circulator Leakage Canceler for Retro-Directive RF System," in *IEEE Microwave and Wireless Components Letters*, doi: 10.1109/LMWC.2022.3170590.
- T. -B. Ngo, **Q. -H. Do**, and S. -W. Yoon, "A Compact 6-bit Phase Shifter in 65 nm RF CMOS Technology for ISM Band," *Journal of Semiconductor Technology and Science*, doi: 10.5573/JSTS.2022.22.3.198.

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## REFERENCES

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