Woosol Lee

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RESEARCH INTEREST

Wireless power transfer (WPT), metamaterials for RF/microwave applications, low-loss conductors for high-frequency applications

EDUCATION

University of Florida, Gainesville, Florida — Aug 2018 – present
Ph.D. in Electrical and Computer Engineering Department / Teaching Assistant & Research Assistant / Cumulative GPA: 4.00 / 4.00

Ajou University, Suwon, Korea — Feb 2014 – Mar 2016
M.S in Network Centric Warfare Engineering (Computer Engineering) / Cumulative GPA: 4.50/4.50

Korea Military Academy, Seoul, Korea — Feb 2007 – Mar 2011
B.S in Statistical Information Analysis, Bachelor of Military Art and Science (Dual degree) / Cumulative GPA: 3.50/4.30 (Rank : 32 out of 216)

WORK EXPERIENCE (Selected)

Military Officer (captain), Republic of Korea army, Korea — 2011 – present
- Guard post platoon leader (2011), Company executive commander (2012), Aid-De-Camp of the Capital corps commander (2012-2014), etc.

Assistant Professor, Department of Computer Engineering, Korea Army Academy at Yeongcheon, Korea 2016 – 2018
- Teach courses including but not limited to: Network Security, Cyber Warfare, and Computer Architecture.
- Administrative officer of the Department of Computer Engineering.

PUBLICATIONS

- JOURNAL PAPERS

1. **Woosol Lee** and YK Yoon, "Tunable Metamaterial Slab for Efficiency Improvement in Misaligned Wireless Power Transfer," *IEEE Microwave and Wireless Components Letters*, vol. 30, no. 9, pp. 912-915, 2020 (DOI: 10.1109/LMWC.2020.3015680).

2. **Woosol Lee** and YK Yoon, "Wireless Power Transfer Systems Using Metamaterials: A Review," *IEEE Access*, vol. 8, pp. 147930-147947, 2020 (DOI: 10.1109/ACCESS.2020.3015176).

3. **Woosol Lee** and YK Yoon, "Rollable metamaterial screen for magnetic resonance coupling based high efficiency wireless power transfer," *International Journal of Microwave and Wireless Technologies*, pp. 1~9, 2020 (DOI: 10.1017/S1759078720001221).

4. Renuka Bowrothu, Hae-in Kim, **Woosol Lee**, Timothy Clingenpeel, and Yong Kyu Yoon, "Highly Energy Efficient Metaconductor based Integrated RF Passives," *IEEE Microwave Magazine*, 2021 (Submitted).

5. **Woosol Lee** and Sanyoon Oh, "Efficient Feature Selection Based Near Real-Time Hybrid Intrusion Detection System," *KIPS Transactions on Computer and Communication Systems*, Vol 5, No 12, 2016. 9 (DOI: 10.3745/KTCCS.2016.5.12.471).

- CONFERENCE PRESENTATIONS

1. **Woosol Lee,** Haein Kim, Sunghyun Hwang, Saeyoung Jeon, Hyunho Cho, and YK Yoon, "3D integrated high gain rectenna in package with metamaterial superstrates for high efficiency wireless power transfer applications," *2021 IEEE Electronic Components and Technology Conference (ECTC)*, Virtual, 2021 (Accepted).

2. Haein Kim, **Woosol Lee**, and YK Yoon, "Ultra-High Q-factor Through Fused-silica Via (TFV) Integrated 3D Solenoid Inductor for Millimeter Wave Applications," *2021 IEEE Electronic Components and Technology Conference (ECTC)*, Virtual, 2021 (Accepted).

3. **Woosol Lee** and YK Yoon, "High Efficiency Metamaterial-based Multi-scale Wireless Power Transfer for Smart Home Applications," *2021 IEEE / MTT-S International Microwave Symposium (IMS)*, Atlanta, GA, USA, 2021 (Accepted).

4. Hyunho Cho, **Woosol Lee**, and YK Yoon, "Highly Compact Array MIMO Module for EMI Immune 5G Wireless Communications," *2021 IEEE / MTT-S International Microwave Symposium (IMS)*, Atlanta, GA, USA, 2021 (Accepted).

5. **Woosol Lee**, Haein Kim and YK Yoon, "Metamaterial-inspired dual-function loop antenna for wireless power transfer and wireless communications," *2020 IEEE Electronic Components and Technology Conference (ECTC)*, Orlando, FL, USA, pp. 1351-1357, 2020 (DOI: 10.1109/ECTC32862.2020.00214.2020).

6. **Woosol Lee** and YK Yoon, "Dual-functional metamaterial-integrated antenna for wireless power transfer and wireless communications," *US-Korea Conference (UKC)* 2020, Dec. 14 – 17, 2020, Virtual.

7. **Woosol Lee** and YK Yoon, "Experimental investigation of wireless power transfer with metamaterial," *US-Korea Conference (UKC) 2019*, Aug. 14 – 16, 2019, Chicago, IL.

8. **Woosol Lee** and Sanyoon Oh, "A design of Virtual Machine Introspection based malicious process detection architecture using virtualized environment features," *Korea Computer Congress,* pp. 1,066-1,068, 2015. 6.

- THESIS

1. **Woosol Lee**, "Near real-time hybrid intrusion detection system using efficient featrue selection," *Master thesis of Ajou University*, 2016.

PATENT & INVENTION DISCLOSURE

1. YK Yoon and **Woosol Lee**, "Rollable metamaterial screen for magnetic resonance coupling based high efficiency wireless power transfer, Filed for Invention Disclosure (UF# T18029), Feb. 2020, Patent pending for U.S. Non-provisional Patent Application (17/179,839), Feb. 2021.

2. YK Yoon and **Woosol Lee**, "Metamaterial-inspired dual-function loop antenna", Accepted for Invention Disclosure (UF# T18112), Filed for Invention Disclosure (UF# T18112), Mar. 2020, Filed for U.S. Non-provisional Patent Application (17/215,798), April. 2021.

3. YK Yoon and **Woosol Lee**, "High Efficiency Metamaterial-based Multi-scale Wireless Power Transfer for Smart Home Applications", Filed for Invention Disclosure (UF# T18407), Feb. 2021, Filed for U.S. Provisional Patent Application (63/167,994), March. 2021.

PROFESSIONAL AFFILIATION

Graduate student member, Institute of Electrical and Electronics Engineers (IEEE) 2018 – present
- Membership of IEEE Young Professionals (YP), Microwave Theory and Techniques Society (MTTS) Antennas and Propagation Society (APS), Electronics Packaging Society (EPS)

Member, Korean American Scientists and Engineers Association (KSEA) 2018 – present

Member, Korean military officer association (Eastern USA 2nd branch) member 2018 – present

Member, Interdisciplinary Microsystems Group (IMG) member 2018 – present
- College-wide multi-departmental education and research program of the College of Engineering at the University of Florida

Member, Multidisciplinary Nano & Microsystems Laboratory (MnM) group member 2018 – present
- Laboratory directed by Dr. Yong-Kyu "YK" Yoon

SERVICES & EXTRACURRICULAR ACTIVITIES (Selected)

Reviewer 2020 – present
- IEEE Access
- International Journal of Sustainable Engineering
- Micro and Nano Systems Letter

KSEA Gainesville-Florida Chapter Student council member 2018 – present
- Organization student member of "2019 KSEA-GFC National Mathematics & Science Competition", April 13th, 2019, etc.

IEEE EPS UF student chapter executive committee chair 2021

IEEE EPS UF chapter student executive committee member 2020

Lab safety manager 2020 – present
- Photolithography lab (UF Benton Hall 237C) in UF MnM research group

Group Leader of the "Korean-UF Eutrophication Study Team (KUEST)" 2019, 2020
- in Young professionals NET group program granted by the Korean Federation of Science and Technology Societies (KOFST)

University of Florida Korean Student Association (UFKSA) member 2018 – present

KSEA Autonomous vehicle working group member Aug 2019 - Dec 2019
- Technology demand survey proposal accepted by KSEA and KEIT (Korea Evaluation Institute of Industrial Technology) and presented in UKC 2019
- Participated the autonomous vehicle working group meeting (Aug-Dec 2019) for the KEIT's Request for Proposals

AWARDS & HONORS (Selected)

2021 IEEE ECTC Student Travel Award 2021
- Only top 8 students were selected among ≥100 accepted abstracts for this award.
- Awarded and supported by IEEE/EPS.

Best Teaching Assistant Award 2021
- Awarded by the Department of Electrical and Computer Engineering, University of Florida.
- Students select award (Course: Semiconductor Device Fabrication)

Outstanding Achievement Award 2020
- Awarded by the Herbert Wertheim College of Engineering (HWCOE) and International Center, University of Florida.
- In recognition of outstanding academic achievement, strong leadership skills, and community engagement.

Best paper award 2020
- US-Korea Conference (UKC) 2020 / Electrical, Electronic, and Communication (EEC) symposium, Virtual

Korean Scholastic Excellence Award 2020
- Awarded by the Herbert Wertheim College of Engineering (HWCOE), University of Florida.
- In recognition of scholastic excellence in graduate studies and researches.

KSEA-KUSCO graduate scholarship award 2020
- Only 20 graduate students in national wide each year awarded by Korean American Scientists and Engineers Association and Korea-U.S. Science Cooperation Center.
- In recognition of outstanding academic achievement, strong leadership skills, and community engagement.

Full tuition and stipend scholarship for the Ph.D. course in University of Florida 2018 - present
- Awarded by the Army, Republic of Korea Army Headquarters.

Excellent teaching award, Korea Army Academy at Yeongcheon 2017

Best academic achievement award, Ajou university 2015, 2016

Best academic achievement in TSFO Officer's Basic Course, awarded by the Commander, Capital Corps 2013

Excellent management of troops, awarded by the Commander, 17th Infantry Division 2012

Successful mission in observation posts, awarded by the Commander, 17th Infantry Division 2012

Best Platoon Leader in 17th Infantry Division, awarded by the Commander, 17th Infantry Division 2011

SKILLS

Programming languages
- C, C++, MATLAB, Java.

Software
- High Frequency Structure Simulator (HFSS), Advanced Design System (ADS), Cadence.

Others
-Microfabrication, RF characterization, milling machine, etc.

REFERENCES

Ph.D. Advisor:

Yong-Kyu "YK" Yoon, Ph.D.
Professor and Graduate Coordinator, Department of Electrical and Computer Engineering
Director, Multidisciplinary nano and Microsystems (MnM) Laboratory
Member, Interdisciplinary Microsystems Group (IMG)
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