Yongwoo Lee's Curriculum Vitae
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YONGWOO LEE

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EDUCATION

Pohang University of Science and Technology (POSTECH)
Ph.D. Department of Convergence IT Engineering (Electrical Eng.) (2018.03 – 2024.02)
- Research thesis: Design and Fabrication of Robust Organic Electrochemical Transistors for Bioelectronic Applications (Supervisor: Prof. Sungjune Jung)

Pohang University of Science and Technology (POSTECH)
B.S. Department of Electrical Engineering (Graduated Cum Laude) (2014.03 – 2018.02)

Chungnam Science High School, Korea
Physics Class (2012.03 – 2014.02)

RESEARCH EXPERIENCE

Postdoctoral Researcher, *Ulsan National Institute of Science and Technology (UNIST)* (2024.02 – Present)
- Department of Electrical Engineering (Principal Investigator: Prof. Jimin Kwon)

Visiting Researcher, *University of Cambridge* (2020.11 – 2021.04)
- Project: Inkjet-printed organic electrochemical transistor for in vivo recordings of brain activity (Bioelectronics Laboratory, Prof. George G. Malliaras)

AWARDS & SCHOLARSHIPS

National Research Foundation of Korea (NRF) Postdoctoral Fellowship (2024.09 – 2026.08)
Project title: Development of large-area intelligent reflective surface for next-generation wireless communications using printed organic electrochemical transistors

BrainKorea21 Four, Postdoctoral Fellowship (2024.09 – 2025.02)

BrainKorea21 Four, POSTECH Alchemist program (2022.10 – 2023.10)
Project title: Printed organic synapse arrays for brain-mimicking neural networks using ion-electronic mixed conductors

BrainKorea21 Interdisciplinary Research Group Support Funding Program (2022.05 – 2023.02)

National R&D Real Challenge Program for Young Scientists (2019.07 – 2019.12)
Project title: Wearable sensors to enhance the human sixth sense during sleep

Korea Ministry of Science, ICT and Future Planning Scholarships (Graduate Scholarship) (2018.03 – 2020.12)

National Presidential Science Scholarships (Full Undergraduate Scholarship) (2014.03 – 2018.02)

Excellent Paper Challenge Prize, 4th POSTECH Best Paper Competition (2024.01)

Best Presentation Award, The Polymer Society of Korea 2022 Fall Meeting (2022.10)

Best Poster Award, Korea Flexible & Printed Electronics Society (2021.12)

Honorable Mention (2021.11)
(Introducing My Research, 3 Minutes Science Speech Contest hosted by POSTECH)

Real Challenge Program Best Presentation, Korea Institute of Human Resources Development in Science and Technology (KIRD) (2020.01)

MAKERS IDEATHON Award of excellence (2016.02)

WORK EXPERIENCE

Postdoctoral Researcher

- Scaling-Up Printed Electronics – Ion-gated FET RF varactors, Intelligent reflective surface (RIS) for 5G/6G, Panel-level packaging with EHD inkjet printing
- Monolithic 3D Oxide Semiconductor FETs for Memory – Gate-all around vertical channel oxide semiconductor FETs, Stabilization of oxide semiconductor FETs

Graduated Student

- Development of design process for the fabrication of inkjet printed circuits
- Researched in reliable inkjet-printed top contacts for staggered bottom-gate polymer TFTs
- Investigated how to prevent degradation by time of an printed organic Schottky diode
- Designed and constructed low-voltage driven differential amplifier by new anodization method
- Analyzed printed integrated circuit based on 3D printed organic transistors with comparisons between stacked ring oscillator and planar ring oscillator
- Gained experience in setting-up automatic measurement system of organic transistors

SK Hynix intern (summer, 2016)

- Worked as an intern in High Bandwidth Memory (HBM) team in DRAM division
- Evaluated the quality of wafers with Probe Test Infra and learned TSV technology
- Participated in group meeting and weekly team meetings and presented ideas to develop the intern program

Undergraduate

- Conducted electrical engineering project - Design software of drum's sheet music generation system and implement hardware of a drum robot

TEACHING EXPERIENCE

TA (EE57801, Advanced Semiconductor Device Engineering), UNIST (2024.09 – 2024.12)

TA (Printed Organic Thin Film Transistor), POSTECH (2019.03 – 2019.07)

- Demonstrating electrical parameter extraction in organic transistor by MATLAB

TA (Creative IT Design II), POSTECH (2018.09 – 2018.12)

- Teaching problem-solving skills by guiding through set problems with detailed feedback

Freshmen Mentoring Program (FMP) Mentor (2016.02 – 2017.02)

- Guiding freshmen to take interests in electric engineering to raise aspirations

Korea Foundation for the Advancement of Science and Creativity (KOFAC) STEAM Mentor (2016.07 – 2016.08)

- Hosting a scientific experiment experience program for underprivileged students

The Korea Student Aid Foundation (KOSAF) Mentoring Program Mentor (2014.01 – 2015.01)

- Mentoring for future scientific career with relevant course advice for high school students

SKILLS & TECHNIQUES

Transistor Fabrication	E-beam lithography, photolithography, direct laser lithography, inkjet printer, nozzle printer, chemical vapor deposition (CVD), pulsed green laser
Measurement Equipment	SEM, AFM, XPS
Programs	Matlab, Origin, C, Visio, Advanced Design System, Autocad
Languages	Korean, English

PUBLICATIONS&CONFERENCES

International Journals

1. H. Gu, M. Park, H. Lee, H. Jung, **Y. Lee**, A. R. Choi, I.-K. Oh, J. Kim, J. Kwon*, "Indium tin oxide vertical-channel transistors for scaled 4F² 2T0C gain cell memory with etched sidewall cleaning", *IEEE Electron Device Letters,* (submitted). 2025 (co-author)
2. J. Lee, **Y. Lee**, H. Jung, T. Zou, M. Kim, H. Gu, H. Lee, T. H. Park, D. CM. Yang, C. W. Myung, A. Liu, J. Kwon*, and Y-Y. Noh*. "Wafer-scale non-ferroelectric κ-phase 2D In_2Se_3 transistors", *Sci. Adv.*, (submitted). (first co-author)
3. **Y. Lee**, S. Park, J. Kwon*, K. Song*, and, S. Jung*. "High-performance nano-patterned channel organic electrochemical transistors for wide-bandwidths sensing platforms", *Sci. Adv.*, (revision) 2025 (first co-author)
4. H. Jung, M. Kim, **Y. Lee**, G. B. Sim, H. Gu, S. Hong, S. Lee, J. Lee, D. Lee, T. Zou, K. Kang, C. W. Myung, Y. Y. Noh*, J. Kwon*, "Back-end-of-line-compatible passivation of sulfur vacancies in MoS_2 transistors using electron-withdrawing benzenethiol", *ACS Nano*, 19, 6, 6069-6078, Feb. 2025 (co-author)
5. S. Chai, Y. Lee, R. Owens, H-R. Lee, **Y. Lee***, W. Kim*, S. Jung*, "Dynamic monitoring of a 3D-printed airway tissue model using an organic electrochemical transistor", *Biomaterials*, 314, 122806, Mar. 2025 (corresponding author).
6. S. Baek*, Y. Jo, **Y. Lee**, S. Jung*, J. Kwon*, "Design and integration of organic printed thin-film transistor-based soft biosensors for wearable applications", *ACS Appl. Electron. Mat.*, 6, 11, Nov. 2024 (co-author)
7. **Y. Lee**, H. Jung, Y. Jo, S. Baek, H. Park, S. J. Park, S. Jung, Y. Y. Noh*, J. Kwon*, "Dual-gate carbon nanotube thin-film transistors with printed channel and passivation interlayer on plastic foil", *IEEE Electron Device Letters,* 45, 10, Aug. 2024 (first co-author)
8. **Y. Lee**, B. Kang, S. Jung*, J. Kwon*, "Stabilizing Schottky junction in conjugated polymer diodes enables long-term reliable radio-frequency energy harvesting on plastic", *npj Flexible Electronics,* 8, 41, July. 2024 (first author)
9. **Y. Lee**, A. C.-Lombarte, S. Han, B. J. Woodington, S. Chai, A.G. Polyravas, S. V.-Bosom, E-H. Kim, G. Malliaras*, S. Jung*, "Tunable organic active neural probe enabling near-sensor signal processing", *Adv. Mater.*, 230178, May. 2023 (first author, selected as an inside-front cover paper)
10. S. Baek, H. Matsui, T. Mano, J. A. Park, Y. Jo, **Y. Lee**, S. Tokito, J. Kwon*, and S. Jung*, "Dual-gate thin film transistor lactate sensors operating in the subthreshold regime", *Biosens. Bioelectron.* 222, 114958, Feb. 2023 (co-author)
11. J. A. Park, Y. Youm, H. -R. Lee, **Y. Lee**, S. L. Barron, T. Kwak, G. T. Park, Y. -C. Song, R. M. Owens, J. H. Kim, and S. Jung*, "Transfer Tattoo-Like Cell Sheet Delivery induced by Interfacial Cell Migration", *Adv. Mater.* vol. 35(4), Jan. 2023 (co-author, selected as a frontispiece cover paper)
12. J. Kwon*, S. Beak, **Y. Lee**, S. Tokito, S. Jung*, "Layout-to-bitmap conversion and design rules for inkjet-printed large-scale integrated circuits", *Langmuir*, vol. 37(36), pp. 10692-10701, Sept. 2021 (co-author)
13. W. Kim, J. Kwon*, **Y. Lee**, S. Baek and S. Jung*, "Phase-Separated, Printed Organic Thin-Film Transistor-Based Nonvolatile Memory with Enhanced Data Retention," *Adv. Mater. Technol.* vol. 5(7), pp. 2000228, May 2020 (co-author)
14. **Y. Lee**, J. Kwon*, S. Jung, W. Kim, S. Baek, and S. Jung*, "Reliable inkjet contact metallization on printed polymer semiconductors for fabricating staggered TFTs", *Appl. Phys. Lett.* vol. 116, pp. 153301, Apr. 2020 (first author)
15. J. Kwon, **Y. Lee**, Y. Jo, and S. Jung*, "Fabrication of ultrathin low-voltage-driven printed organic circuits with anodized gate islands", *Org. Electron.*, vol. 62, pp. 77–81, Nov. 2018 (first co-author)

Domestic Journals

1. Y. Jo, **Y. Lee**, S. Chai, and S. Jung, "Inkjet-Printed Organic Electronic Devices for Biomedical Diagnosis", *The Korean Biochip Society (한국바이오칩학회),* vol. 17, no. 2, pp. 16-18, 2022.
2. W. Kim, Y. Jo, **Y. Lee**, and S, Jung, "Inkjet-based flexible electronic circuits and sensors (잉크젯 기반 유연 인쇄 전자회로 및 센서)", *Korea Flexible & Printed Electronics Society (한국유연인쇄전자학회),* vol. 2, pp. 20-31, 2021.

International Conferences

1. N. Kim, H. Jung, Y. Choi, H. Kim, S. Kim, **Y. Lee**, Y. Park, S. Koh, H. Kim and J. Kwon, "Micro-3D-Printed Antenna-in-Package Substrates With Quasi-Coaxial Through Vias, IEEE 75th Electronic Components and Technology Conference (ECTC), Dallas, Texas, United States, May (2025)
2. J. Lee, **Y. Lee**, J. Kwon, and Y.-Y. Noh, "Wafer-scale uniform non-ferroelectric k-phase In_2Se_3 transistors via thermal evaporation", 2025 MRS Spring Meeting, Seattle, United States, April (2025)
3. S. Park, **Y. Lee**, and S. Jung, "Fast and High-Transconductance Organic Electrochemical Transistor for Implantable Peripheral Nerve Recording System", 2024 MRS Fall Meeting, Boston, United States, December (2024)
4. **Y. Lee**, B. Kang, S. Jung*, J. Kwon, "Stable Radio-Frequency Energy Harvesting on Plastic Foil with Printed Conjugated Polymer Schottky Diodes", ICFPE 2024, Taipei, Taiwan, August (2024)
5. S. Park, **Y. Lee**, and S. Jung, "Fast Response and High Transconductance Organic Electrochemical Transistors with Micro-structured Channel Geometry", 21th International Symposium on the Physics of Semiconductor and Apploications (ISPSA), Jeju, Korea, June (2024)
6. N. Kim, H. Jung, **Y. Lee**, S. Eum, Y. Han, H. Park, Y. Park, and J. Kwon, "Micro-3D-printed packaging substrates with embedded through holes for organic interposers, IEEE 74th Electronic Components and Technology Conference (ECTC), Denver, United States, May (2024)
7. **Y. Lee**, A. C.-Lombarte, S. Han, B. J. Woodington, S. Chai, G. G. Malliaras, and S. Jung, "Highly Sensitive and Conformable Brain-Integrated Inkjet-Printed Voltage Amplifiers for Neural Interfaces", IMID 2023, BEXCO Busan, South Korea, August (2023)
8. **Y. Lee**, A. C.-Lombarte, S. Han, B. J. Woodington, S. Chai, A.G. Polyravas, S. V.-Bosom, G. G. Malliaras, and S. Jung, "Highly Sensitive and Tunable Voltage Amplifiers Based on Inkjet-Printed Organic Electrochemical Transistors for *In Vivo* Recordings of Brain Activity", 2022 MRS Fall Meeting, Boston, United States, November (2022)
9. S. Chai, Y. Lee, **Y. Lee**, W. Kim, R. Owens, and S. Jung, "Monitoring of 3D-Printed Airway Model Integrity with an Printed Organic Electrochemical Transistor", 2022 MRS Fall Meeting, Boston, United States, November (2022)
10. **Y. Lee**, A. C.-Lombarte, S. Han, B. J. Woodington, S. Chai, A.G. Polyravas, S. V.-Bosom, G. G. Malliaras, and S. Jung, "Tunable organic voltage amplifier for in vivo recordings of brain activity", 12th ICFPE 2022, Jeju, South Korea, October (2022)
11. Y. Youm, H. -R. Lee, **Y. Lee**, and S. Jung, "Tattoo sticker-like 3D flexible Cell sheet transfer platform based on Spontaneous Interfacial cell migration", TERMIS-AP 2022, Jeju, South Korea, October (2022)
12. Y. Youm, H. -R. Lee, **Y. Lee**, and S. Jung, "Interfacial cell migration based freeform cell sheet delivery method", Biofabrication 2022 PISA, Pisa, Italy, September (2022)
13. **Y. Lee** and S. Jung, "Inkjet-Printed Organic Voltage Amplifier for Neural Interfaces", 6th ICAE 2021, Jeju, South Korea, November (2021)
14. S. Chai, **Y. Lee**, and S. Jung, "Transepithelial/transendothelial electrical resistance measurement by organic electrochemical transistor", IUPAC-MACRO 2020+, ICC Jeju, South Korea, May (2021)
15. **Y. Lee**, S. Chai, and S. Jung, "Fabrication of Inkjet-Printed Organic Voltage Amplifier Based on Electrochemical Transistor", IUPAC-MACRO 2020+, ICC Jeju, South Korea, May (2021)
16. **Y. Lee**, J. Kwon, S. Jung, S. Baek, W. Kim, and S. Jung, "Reliable Inkjet-Printed Top Contacts for Staggered Bottom-Gate Polymer TFTs", AMSM 2019, Incheon, South Korea, October (2019)
17. W. Kim, J. Kwon, **Y. Lee**, and S. Jung, "A Phase-Separated Polymer Blocking Layer for Enhancing Data Retention in Flexible Printed Nonvolatile Organic Memories", IFETC 2019, Vancouver, Canada, August (2019)
18. J. Kwon, W. Kim, **Y. Lee**, and S. Jung, "Technology Development for Direct-Printed Dual-Gate Organic TFT Circuit Fabrication with 3-D integration", IFETC 2019, Vancouver, Canada, August (2019)
19. **Y. Lee**, J. Kwon, S. Jung, W. Kim, S. Baek, and S. Jung, "Flexible printed top-contact organic thin-film transistors", IFETC 2019, Vancouver, Canada, August (2019)
20. **Y. Lee**, J. Kwon, Y. Jo, and S. Jung, "A method to form anodic aluminum oxide dielectrics on separate gate patterns for the fabrication of ultra-flexible, low-voltage organic circuits", ICSM 2018 BEXCO, Busan, South Korea, July (2018).

Domestic Conferences

1. N. Kim, H. Jung, Y. Choi, **Y. Lee**, Y. Park, S. Koh, H. Kim, and J. Kwon, "Micro-3D-Printed Antenna-in-Package Substrates with Quasi-Coaxial Through Vias", 2025 한국반도체학술대회, Gangwon, Korea, February 2025 (**현장우수포스터상**)
2. Y. Choi, **Y. Lee**, H. Jung, N. Kim, and J. Kwon, "Inkjet-Printed Photoresist Films for Panel-Level Packaging Using Glass Interposers", 2025 한국반도체학술대회, Gangwon, Korea, February 2025
3. H. Gu, M. Park, H. Lee, **Y. Lee**, and J. Kwon, "Interlayer Dielectric Engineering in Vertical-Channel ITO Field-Effect Transistors for Bias-Reliable Operation", 2025 한국반도체학술대회, Gangwon, Korea, February 2025
4. M. Park, H. Gu, H. Lee, **Y. Lee**, and J. Kwon, "Top-Gate Oxide Semiconductor FETs for Reliable 2T0C Read/Write Operation with Reduced Capacitive Coupling", 2025 한국반도체학술대회, Gangwon, Korea, February 2025 (**KCS 최우수 논문상**)
5. H. Lee, H. Gu, M. Park, **Y. Lee**, and J. Kwon, "Atomic Layer Deposition for High-Mobility and Reliable ITZO Thin Film Transistors", 2025 한국반도체학술대회, Gangwon, Korea, February 2025
6. Y. Choi, **Y. Lee**, and J. Kwon, "Inkjet-Printed Photoresist Cu Bump Process for Panel-Level-Packaging", 2024 한국유연인쇄전자학회 추계 학술대회, Jeonju, Korea, October 2024
7. **Y. Lee**, S. Jung, "Hybrid lithographic/inkjet-printed organic electrochemical transistor for high-speed operation", 2023 한국유연인쇄전자학회 춘계 학술대회, Yeosu, Korea, April 2023
8. **Y. Lee**, S. Jung, "Recordings of brain activity using Embedded, Inkjet-Printed Voltage Amplifiers based on Organic Electrochemical Transistor", 2022 추계 한국고분자학회 학술대회, Daegu, Korea, October 2022
9. S. Chai, Y. Lee, **Y. Lee**, W. Kim, H. Lee, JY. Yoo, R. Owens, and S. Jung, "Monitoring of 3D printed airway model integrity with an organic electrochemical transistor", 2022 추계 한국고분자학회 학술대회, Daegu, Korea, October 2022
10. **Y. Lee**, S. Jung, "Inkjet-Printed Biomedical Devices", 2022 한국유연인쇄전자학회 추계 학술대회, Jeju, Korea, October 2022 (**우수논문발표상－영어부문**)
11. **Y. Lee**, and S. Jung, "Inkjet-printed low-noise voltage amplifier based on organic electrochemical transistors for in vivo recordings of brain activity", 2021 한국유연인쇄전자학회 학술대회, Hoengseong, Korea, December 2021 (**우수포스터상**)
12. S. Baek, J. Kwon, W. Kim, **Y. Lee**, and S. Jung, "높은 수율, 균일성을 갖는 잉크젯 인쇄 기반 능동형 트랜지스터 어레이", 2019 한국유연인쇄전자학회 학술대회, Jeju, Korea, September 2019

Patent

1. **이용우**, 정학순, 권지민, "이온 박막 트랜지스터에 기반한 RF 신호의 반사 조절을 위한 전자 장치, 및 그 동작 방법", Korea Patent. (출원)KR 10-2025-0005702 (2025.01.14)
2. **이용우**, 정학순, 권지민, "이온 게이트 박막 트랜지스터를 포함하는 반사 부재, 전자 장치, 및 그 동작 방법", Korea Patent. (출원) KR 10-2025-0005699 (2025.01.14)
3. 이현진, **이용우**, 구현호, 박민호, 권지민, "영역 선택적 원자층 박막 증착(AS－ALD)를 이용한 수직채널 GATE－ALL－AROUND 트랜지스터 구조와 제작방법", Korea Patent. (출원) KR10-2025-0002764 (2025.01.08)
4. 구현호, 박민호, **이용우**, 권지민, "수직형 산소터널 CHANNEL ALL AROUND (CAA) 구조와 제작 방법", Korea Patent. (출원) KR10-2025-0002761 (2025.01.08)
5. **이용우**, 정성준, "마이크로 및 나노 스케일의 요철 채널 구조를 갖는 고속 유기 전기화학 트랜지스터", Korea Patent. (출원) KR10-2024-0008574 (2024.01.19)

REFEREES