Juhee Ko

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Education

2019.03–2021.02 **Masters of Science in Mechanical Engineering**,
Korea Advanced Institute of Science and Technology.
Advisor: Prof. Jungchul Lee

2015.03–2019.02 **Bachelor of Mechanical Engineering**,
Sogang University, *GPA – 4.2/4.5*.
Summa Cum Laude

Research Area

- Nanomechanical sensing with heater-integrated microchannel resonator (Master-Ph.D)
- Hydrogel-modified resonating physical/chemical resonating sensor (Undergraduate-Master)

Awards

Dec. 6, 2024 **BK 우수논문상**, *KAIST 기계공학과 수여*.
Juhee Ko
- Advanced operation of heated fluidic resonators via mechanical and thermal loss reduction in vacuum

Nov. 18, 2024 **KAIST 우수논문상**, *KAIST 이광형 총장 수여*.
Juhee Ko
- Advanced operation of heated fluidic resonators via mechanical and thermal loss reduction in vacuum

Nov. 7, 2024 **2023 JMST Second Best Paper Award**.
Juhee Ko, Nada Ben Fredj, Rafita Erli Adhawiyah, Jungchul Lee
- Nozzle-based precision patterning with micro-/nano fluidics integrated cantilevers

Nov. 7, 2024 **Bronze Award**, *KSME-LG Future Home Tech Challenge*.
Juhee Ko, Jungchul Lee, Taeyeong Kim
- 가열 유동채널 공진기 기반 멀티모달 센싱을 이용한 압축기 냉매/오일 혼합물 물성 및 열전달 성능 측정

Nov. 7, 2024 **Bronze Award**, *KSME-SEMES Open Innovation Challenge*.
Jungchul Lee, **Juhee Ko**
- 가열 유동채널 공진기 기반 저유량 고점도 유체 유량 비접촉 측정

Nov. 7, 2024 **Bronze Award**, *KSME-SEMES Open Innovation Challenge*.
Jungchul Lee, Taeyeong Kim, **Juhee Ko**
- 3차원 낸드 플래시 메모리 비파괴 검사를 위한 근적외선 간섭 나노스캐너

Feb. 7, 2024 **Bronze Award**, *Samsung Humantech Paper Award*.
Juhee Ko, Hyunjoon Son
- Subcutaneous temperature prediction with cryogenic jet cooling by surface temperature measurements and RNNs

Nov. 3, 2023 **Gold Award**, *KSME-SEMES Open Innovation Challenge*.
Jungchul Lee, **Juhee Ko**
- 가열 유동채널 공진기 기반 하이퍼 멀티모달 측정과 머신 러닝을 활용한 초미량 미확인 액체 인식 기술

Sep. 20, 2023 **Best Poster Presentation Award**, *The 14th Japan-China-Korea Joint Conference on MEMS/NEMS (JCK MEMS/NEMS)*.
Juhee Ko, Jungchul Lee
- Hyper-multimodal measurements with heater-integrated fluidic resonators to analyze quaternary liquid mixtures

May. 18, 2023 **Outstanding Student Oral Presentation Award**, *The 18th International Conference on Nano/Micro Engineered and Molecular Systems (IEEE NEMS 2023)*.
Juhee Ko, Jungchul Lee
- Real-time viscosity measurement under temperature modulation by heater-integrated fluidic resonators

May. 12, 2023 **Outstanding Poster Presentation Award**, *Spring conference of Korean Society of Mechanical Engineering – Micro/Nano division*.
Taeyeong Kim, **Juhee Ko**, Jungchul Lee
- Top-down mass production of uniform silicon nanoparticles via high temperature annealing

Jan. 19, 2023 **Outstanding Student Oral Presentation Award Finalist**, *The 36th IEEE International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2023)*.
Juhee Ko, Bong Jae Lee, Jungchul Lee
- Advanced Thermophysical Properties Measurements using Heater-integrated Fluidic Resonators

Aug. 10, 2022 **Best Online Poster Award**, *18th International Workshop on Nanomechanical Sensing (NMC 2022)*.
Juhee Ko, Bong Jae Lee, Jungchul Lee
- Heated fluidic resonators thermophysical properties and phase transition measurements of ultrasmall liquid volume

Aug. 26, 2022 **Best Paper Award**, *2022 Fall Conference of the Korean Sensors Society*.
Juhee Ko, Bong Jae Lee, Jungchul Lee
- Vacuum operation of heated microchannel resonators for sensitivity enhancement upon thermophysical properties measurements

May. 19, 2022 **Best Paper Award**, *2022 Spring KSME conference – Micro Nano Division* .
Juhee Ko, Bong Jae Lee, Jungchul Lee
- 마이크로채널 공진기를 이용한 100 피코리터 이하 액상 이원화 혼합물의 질량 밀도와 몰분율 동시 측정

Feb. 7, 2022 **Silver Award**, *Samsung Humantech Paper Award*.
Juhee Ko
- Heated microchannel resonator: A new experimental platform for microscale heat transfer

Nov. 20, 2020 **Encouragement Award**, *KSME-SEMES Open Innovation Challenge*.
Juhee Ko, Jungchul Lee, Taeyeong Kim, Bong Jae Lee
- 초고분해능 인쇄 전자 소자를 위한 가열 전극이 통합된 캔틸레버 기반 패터닝 기술

May. 23, 2019 **Encouragement Award**, *Photo Contest in KSME*.
Juhee Ko
- "Manufacturing and Instrumentation Laboratory (MNIL)"

Dec. 13, 2018 **Silver Award**, *KSME-SEMES Open Innovation Challenge*.
Dasom Yang, **Juhee Ko**
- FinFET sidewall 이미징을 위한 초고종횡비 CNT/고분자 팁 기반 Quartz Tuning Fork 스캐닝 기술

Feb. 7, 2018 **Gold Award**, *Samsung Humantech Paper Award*.
Bora Lee, Yeowon Yoon, **Juhee Ko**
- Batch fabrication of photocurable polymeric probes in separable and reusable microfluidic mold assembly

Nov. 02, 2017 **Silver Award**, *KSME-SEMES Open Innovation Challenge*.
Jungchul Lee, Seokbeom Kim, Yeowon Yoon, Bora Lee, **Juhee Ko**
- 차세대 반도체 생산 라인 인라인 분석을 위한 고속 내마모 원자현미경 탐침 상용화 기술

Jul. 14, 2017 **Best Poster Award**, *Nano Korea 2017*.
Juhee Ko, Seokbeom Kim, Yeowon Yoon, Jungchul Lee
- Hydrogel tip attached quartz tuning fork by using a mold fabricated from electrochemically etched tungsten wire

Publications

1. **Juhee Ko**, Jungchul Lee, "Advanced microfluidic systems with temperature modulation for biological applications", Biomicrofluidics (IF 2.6), **(Invited) In review**
2. **Juhee Ko**, Hyunjoon Son, Bong Jae Lee, Gun Ho Kim, Jungchul Lee, "Subcutaneous temperature prediction during cryogenic jet cooling by surface temperature measurements and RNNs", Applied Thermal Engineering (IF 6.4), **246** (1), 122952 (2024). doi:10.1016/j.applthermaleng.2024.122952
3. **Juhee Ko**, Bong Jae Lee, Jungchul Lee, "Advanced operation of heated fluidic resonators via mechanical and thermal loss reduction in vacuo, Microsystems and Nanoengineering (IF 7.9), **9**, 127 (2023). doi:10.1038/s41378-023-00575-3
4. Anna Danielak, **Juhee Ko**, Aminul Islam, David Bue Pedersen, Jungchul Lee, "Hydrophobic surface for direct PEGDA micro-pattern fabrication, Micro and Nano Systems Letters (IF 3.6), **11**, 4 (2023). doi:10.1186/s40486-023-00169-8
5. **Juhee Ko**, Ben Fredj Nada, Adhawiyah Rafita Erli, Jungchul Lee, "Nozzle-based precision patterning with micro/nano-fluidics integrated cantilevers", Journal of Mechanical Science and Technology (IF 1.6), **37** 887-900 (2023). doi:10.1007/s12206-023-0130-5
6. **Juhee Ko**, Faheem Khan, Youngsuk Nam, Bong Jae Lee, Jungchul Lee, "Nanomechanical sensing using heater-integrated fluidic resonators" Nano Letters (IF 10.8), **22** (19), 7768-7775 (2022). doi:10.1021/acs.nanolett.2c01572
Selected as a Front Cover
7. **Juhee Ko**, Bong Jae Lee, Jungchul Lee, "Towards highly specific measurement of binary mixtures by tandem operation of nanomechanical sensing system and micro-Raman spectroscopy" Sensors and Actuators: B-Chemical (IF 8.4) **367**, 132133 (2022). doi:10.1016/j.snb.2022.132133

8. Taeyeong Kim^{+}, **Juhee Ko**$^{+}$, Jungchul Lee, "Self-assembled silicon membrane resonator for high vacuum pressure sensing" Vacuum (IF 4.0) **201**, 111101 (2022). doi: 10.1016/j.vacuum.2022.111101
9. **Juhee Ko**, Jaewoo Jeong, Sukbom Son, Jungchul Lee, "Cellular and biomolecular detection based on suspended microchannel resonators" Biomedical Engineering Letters (IF 4.6), **11**, 367–382 (2021). doi: 10.1007/s13534-021-00207-7
10. Danny Wong, Osama Abuzalat, **Juhee Ko**, Jungchul Lee, Seonghwan Kim, Simon S. Park, "Intense pulsed light-treated near-field electrospun nanofiber on a quartz tuning fork for multimodal gas sensors" ACS Applied Materials & Interfaces (IF 9.5), **12**, 21, 24308–24318 (2020). doi: 10.1021/acsami.0c02263
11. **Juhee Ko**, Donghyuk Lee, Bong Jae Lee, Sang Ken Kauh, Jungchul Lee, "Micropipette resonator enabling targeted aspiration and mass measurement of single particles and cells" ACS Sensors (IF 8.9), **4**, 3275-3282 (2019). doi: 10.1021/acssensors.9b01843
    Selected as a Back Cover
12. **Juhee Ko**, Amun Jarzembski, Keunhan Park, Jungchul Lee, "Hydrogel tip attached quartz tuning fork for shear force microscopy" Micro and Nano Systems Letters (IF 3.6) **6**, 8 (2018). doi: 10.1186/s40486-018-0071-4
13. **Juhee Ko**, Yeowon Yoon, Jungchul Lee, "Quartz tuning forks with hydrogel patterned by dynamic mask lithography for humidity sensing" Sensors and Actuators: B-Chemical (IF 8.4) **273**, 10, 821-825 (2018). doi: 10.1016/j.snb.2018.06.099
14. Jaeseol Lee, Doyoun Kim, Yeowon Yoon, Bora Lee, **Juhee Ko**, Jungchul Lee, "Hydrogel tip integration onto tipless silicon cantilevers for atomic force microscopy and its facile regeneration" Journal of Microelectromechanical Systems (IF 2.7) **27**, 125-126 (2018). doi: 10.1109/JMEMS.2018.2805778

Patents

Feb. 2024 **하이퍼 멀티모달 측정과 딥러닝을 활용한 초미량 미확인 액체 인식 기술** (Ultrasmall volume liquid identification by using hyper-multimodal-measurements and deep learning)
Jungchul Lee, **Juhee Ko** / Korean Patent, 10-2024-0018549

Aug. 2023 **열처리 영역 주변부의 온도 경향성 분석을 통한 깊이 방향 온도 예측 장치 및 방법** (Apparatus and method for predicting temperature in depth direction through temperature trend analysis around heat treatment area)
Jungchul Lee, **Juhee Ko**, Gun-Ho Kim, Hyunjoon Son / Korean Patent, 10-2023-0102428

Mar. 2022 **압력 측정장치와 이를 이용한 압력 측정방법** (Pressure sensing device and pressure sensing method using the same)
Jungchul Lee, Taeyeong Kim, **Juhee Ko** / Korean Patent, 출원 10-2022-0029553, 등록 (Dec. 2023) 10-2613766

Aug. 2021 **미소량유체의 열물성 측정장치 및 측정방법** (Microchannel resonator device for thermophysical properties measurement and its methodology)
Jungchul Lee, **Juhee Ko**, Bong Jae Lee / Korean Patent, 10-2022-0001182

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May. 2021 **입자 측정장치 및 입자 측정방법** (Sensor integration of interferometric and resonance measurement systems for identifying heterogeneous viruses)
Jungchul Lee, **Juhee Ko**, Taeyeong Kim / Korean Patent, 10-2021-0066499 (application), 10-2469917 (publication)

Feb. 2021 **가열식 캔틸레버 구조 유동 채널을 갖는 인쇄용 잉크 디스펜싱 장치 및 이의 제조 방법** (Viscosity control and high resolution printing technology with printed electronics inks using heating electrode and flow channel integrated resonator)
Jungchul Lee, **Juhee Ko**, Faheem Khan / Korean Patent, 10-2021-0026592

Jun. 2019 **대형 사이즈 하이드로젤 탐침 생산방법 및 하이드로젤 탐침**
Jungchul Lee, **Juhee Ko**, Keunhan Park, Amun Jarzembski / Korean Patent, 10-2017-0159925 (application), 10-2019-0061489 (publication)

Conferences

Oct. 2024 (Oral) **IEEE Sensors**, Kobe, Japan
Juhee Ko, Jungchul Lee
Hot microtube flowmetry with heater-integrated microchannel resonators

Sep. 2024 (Poster) **The 26th Korean MEMS Conference (KMEMS 2024)**, Jeju Island, Korea
Juhee Ko, Jungchul Lee
가열 채널 공진기의 열/기계 물성 스펙트로스코피를 이용한 액상 혼합물 성분 분석 방법

Sep. 2023 (Poster) **The 14th Japan-China-Korea Joint Conference on MEMS/NEMS (JCK MEMS/NEMS)**, Jeju, Korea
Juhee Ko, Jungchul Lee
Hyper-multimodal measurements with heater-integrated fluidic resonators to analyze quaternary liquid mixtures

June. 2023 (Poster) **The 22nd International Conference on Solid-State Sensors, Actuators and Microsystems**, Kyoto, Japan
Juhee Ko, Hyunjoon Son, Seongjin Kim, Gun-Ho Kim, Jungchul Lee
Sub-skin temperature prediction from skin temperature distribution for frostbite-free cryo-anesthesia

May. 2023 (Oral) **18th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE NEMS 2023)**, Jeju Island
Juhee Ko, Jungchul Lee
Real-time viscosity measurement under temperature modulation by heater-integrated fluidic resonators

May. 2023 (Poster) **18th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE NEMS 2023)**, Jeju Island
Rafita Erli Adhawiya, **Juhee Ko**, Jungchul Lee
Electroless Gold Deposition and 4-Mercaptopyridine Modification onto The Tipless Cantilever for Mercury Ion Detection

Mar. 2023 (Poster) **The 25th Korean MEMS Conference (KMEMS 2023)**, Jeju Island
Juhee Ko, Hyunjoon Son, Seongjin Kim, Gun-Ho Kim, Jungchul Lee
Subsurface temperature prediction by neural networks with in-situ surface temperature measurement during skin cryo-anesthesia

Jan. 2023 (Oral) **The 36th IEEE International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2023)**, Munich, Germany
Juhee Ko, Bong Jae Lee, Jungchul Lee
Advanced thermophysical properties measurements using heater-integrated fluidic resonators

Nov. 2022 (Poster) **2022 Fall conference of Micro Nano Systems (MNS)**, Gwangju
Juhee Ko, Jungchul Lee
Uncertainty analysis for fast and synchronized multimodal measurements using a microscope heater-integrated fluidic resonator

Nov. 2022 (Oral) **2022 Fall conference of Korean Society of Mechanical Engineering (KSME)**, Jeju Island
Juhee Ko, Bong Jae Lee, Jungchul Lee
가열 소자 통합 채널 공진기의 액체 열물성 측정 성능 개선을 위한 진공 환경 구동

Aug. 2022 (Poster) **2022 Fall Conference of the Korean Sensors Society (KSS)**, Yeosu
Juhee Ko, Bong Jae Lee, Jungchul Lee
Vacuum operation of heated microchannel resonators for sensitivity enhancement upon thermophysical properties measurements

Aug. 2022 (Poster) **18th International Workshop on Nanomechanical sensing (NMC2022)**, Bangalore, India (Hybrid)
Juhee Ko, Bong Jae Lee, Jungchul Lee
Heated fluidic resonators for thermophysical properties and phase transition measurements of ultrasmall liquid volume

Apr. 2022 (Poster) **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island
Juhee Ko, Youngsuk Nam, Bong Jae Lee, Jungchul Lee
-Thermophysical properties and phase change measurements for ultrasmall volume liquids using heater integrated microchannel resonators

Apr. 2022 (Poster) **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island
Taeyeong Kim, **Juhee Ko**, Jungchul Lee
-High-vacuum pressure sensor with silicon-on-nothing (SON) membrane resonators

Jan. 2022 (Oral) **Spring conference of Nano Convergence Conference (NCC)**, Gwangju
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Revealing thermophysical properties of 20 pL liquids using microchannel resonators with a built-in heater

Nov. 2021 (Poster) **Micro Nano Systems Conference**, An-myeon Island
Juhee Ko, Bong Jae Lee, Jungchul Lee
-액체 밀도 및 분자 지문의 동시 측정 및 시료 구별 성능의 향상을 위한 공진 주파수 및 라만 측정 시스템의 통합

Nov. 2021 (Oral) **Fall Conference of Korean Society of Mechanical Engineers (KSME)**, Gwangju
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Simultaneous measurement of mass density and mole fraction for sub-100 picoliter liquid binary mixture inside microchannel resonators"

Nov. 2021 (Poster) **Fall Conference of Korean Society of Mechanical Engineers-Thermal Engineering Division (KSME)**, Gwangju
Jeongmin Nam, **Juhee Ko**, Bong Jae Lee, Jungchul Lee
-Precise temperature measurement of a micro-heater by high-resolution infrared thermometry

May. 2021 (Poster) **Spring Conference of Korean Society of Mechanical Engineers-Thermal Engineering Division (KSME)**, Jeju Island
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Thermal properties measurements of liquids using pulse operation with heater integrated microchannel resonators

Apr. 2021 (Oral) **The 23rd Korean MEMS Conference (KMEMS 2021)**, Buyeo
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Dynamic inertial imaging of heater integrated microchannel dispensers for real-time monitoring of bubble jet

Apr. 2021 (Poster) **The 23rd Korean MEMS Conference (KMEMS 2020)**, Buyeo
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Thermal properties measurements of liquids using pulse operation with heater integrated microchannel resonators

Jan. 2021 (Poster) **The 34th International Conference on Micro Electro Mechanical Systems**, Munich(Online), Germany
Juhee Ko, Faheem Khan, Bong Jae Lee, Jungchul Lee
-Precision printing and microstructure fabrication using microcantilevers with fluidic channel and dispensing nozzle

Dec. 2020 (Poster) **Fall Conference of Korean Society of Mechanical Engineers (KSME)**, Jeongseon
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Real-time resonance frequency monitoring for microbubble nucleation and evolution inside heater integrated microchannel cantilever

Aug. 2020 (Oral) **The 22nd Korean MEMS Conference (KMEMS 2020)**, Pyeongchang
Juhee Ko, Bong Jae Lee, Jungchul Lee
-Fabrication and characterization of high resolution suspended micro channel dispensers with an integrated heater

Jun. 2019 (Oral) **The 21st Korean MEMS Conference (KMEMS 2019)**, Jeju
Juhee Ko, Faheem Khan, Bong Jae Lee, Jungchul Lee
-Selective aspiration and in-situ mass measurement for microparticles and unicellular Organisms by micropipette resonators

Jun. 2019 (Oral) **2019 20th International Conference on Solid-State Sensors, Actuators and Microsystems and Eurosensors XXXIII (TRANSDUCERS and EUROSENSORS XXXIII)**, Berlin, Germany
Juhee Ko, Faheem Khan, Bong Jae Lee, Jungchul Lee
-Aspiration and mass measurements of microparticles and unicellular organisms via micropipette resonators, doi: 10.1109/TRANSDUCERS.2019.8808552

Jan. 2019 (Open Poster) **The 32nd International Conference on Micro Electro Mechanical Systems**, Seoul, Korea
Juhee Ko, Amun Jarzembski, Yeowon Yoon, Keunhan Park, Bong Jae Lee, Jungchul Lee
-Modifying quartz tuning forks for shear force microscopy and humidity sensing

Jan. 2018 (Poster) **The 31st International Conference on Micro Electro Mechanical Systems (MEMS 2018)**, United Kingdom
Juhee Ko, Amun Jarzembski, Keunhan Park, Jungchul Lee,
-Hydrogel tip attached quartz tuning fork using elastomeric tip mold replicated from electrochemically etched tungsten wire, doi:10.1109/MEMSYS.2018.8346691