

# Taeyeong Kim

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## Education

- 2019– **Intergrated Master’s and Ph.D Candidate in Mechanical Engineering,**  
*Korea Advanced Institute of Science and Technology.*  
Advisor: Prof. Jungchul Lee
- 2015–2019 **Bachelor of Mechanical Engineering,**  
*Sogang University, GPA – 4.15/4.30, Graduated with highest honor (First in Department of Engineering - 공학부 수석 졸업).*

## Research Area

- Self-assembly process of semiconductor material based on high temperature annealing
- Nanomanufacturing based on silicon self-assembly
- MEMS/NEMS

## Awards

- Nov. 2024 **Best Paper Award, 2024 Fall Conference of the Society of Micro and Nano Systems.**  
**Taeyeong Kim, Jungchul Lee**  
- Real-time inspection of semiconductor self-assembly process during high-temperature annealing
- Nov. 2024 **Bronze Award, KSME-LG Future Hometech Challenge.**  
Jungchul Lee, **Taeyeong Kim, Juhee Ko**  
- Measurement of compressor refrigerant/oil mixture properties and heat transfer performance using heated flow channel resonator-Based Multimodal Sensing
- Nov. 2024 **Bronze Award, KSME-SEMES Open Innovation Challenge.**  
Jungchul Lee, **Taeyeong Kim, Juhee Ko**  
- Near-infrared interferometric nanoscanner for non-destructive inspection of 3D NAND flash memory
- Mar. 2024 **Best Oral Presentation Award, The 26th Korean MEMS Conference (KMEMS 2024).**  
**Taeyeong Kim, Jungchul Lee**  
- Top-down fabrication of highly uniform single crystal silicon micro-/nanoparticles via wafer-scale solid jet transfer harvesting

- May. 2023 **Best Poster Award**, *Spring Conference of Korean Society of Mechanical Engineers (KSME) – Micro Nano division.*  
**Taeyeong Kim**, Juhee Ko, Jungchul Lee  
 - Top-down mass production of uniform silicon nanoparticles via high temperature annealing
- May. 2023 **Best Photo Contest Award**, *Spring Conference of Korean Society of Mechanical Engineers (KSME) – Micro Nano division.*  
**Taeyeong Kim**  
 - Micro Alien Invasion of Earth
- Mar. 2023 **Best Oral Presentation Award**, *The 25th Korean MEMS Conference (KMEMS 2023).*  
**Taeyeong Kim**, Minwoo Choi, Bong Jae Lee, Jungchul Lee  
 - Fabrication of silicon-on-insulator structure via simultaneous internal and external oxidation of Silicon-on-Nothing (SON)
- Nov. 2022 **Best Paper Award**, *2022 Fall Conference of the Society of Micro and Nano Systems.*  
**Taeyeong Kim**, Jungchul Lee  
 - Top-down fabrication of single crystal silicon nanoparticles
- Apr. 2022 **Best Paper Award**, *The 24th Korean MEMS Conference (KMEMS 2022).*  
**Taeyeong Kim**, Jungchul Lee  
 - Optimization of deep reactive ion etching for micrometer and sub-micrometer silicon hole arrays with high aspect ratio
- Apr. 2022 **Best Paper Award**, *The 24th Korean MEMS Conference (KMEMS 2022).*  
 Mun Goung Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 - Surrogate model for optimizing annealing duration of self-assembled membrane-cavity structures
- Jan. 2022 **Best Oral Presentation Award**, *Nano Convergence Conference 2022 (NCC 2022).*  
**Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 - Fabrication of single and double-stacked germanium-on-nothing structure by near-melting temperature annealing
- Nov. 2021 **Best Paper Award**, *2021 Fall Conference of the Society of Micro and Nano Systems.*  
 Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 - PCA-based surface inspection methodology for Germanium-on-Nothing structures
- Nov. 2021 **Bronze Award**, *KSME-SEMES Open Innovation Challenge.*  
 Jungchul Lee, Mun Gyeong Jeong, **Taeyeong Kim**, Jaewoo Jeong, Bong Jae Lee  
 - Fabrication of anti-counterfeiting tag with buried micro-scale patterns and its recognition methodology using multi-spectral optical inspection
- Nov. 2020 **Encouragement Award**, *KSME-SEMES Open Innovation Challenge.*  
 Juhee Ko, Jungchul Lee, **Taeyeong Kim**, Bong Jae Lee  
 - 초고분해능 인쇄 전자 소자를 위한 가열전극이 통합된 캔틸레버 기반 패터닝 기술
- Sep. 2020 **Outstanding Teaching Assistant**, *ME 211: Thermodynamics.*  
**Taeyeong Kim**
- Feb. 2019 **Best Graduation Award**, *Sogang University, Graduated with highest honor, 공학부 수석 졸업.*  
**Taeyeong Kim**
- Sep. 2018 **Top Grade Award**, *Sogang University, Top 1% in Department of Engineering for the 1st Semester of 2018.*  
**Taeyeong Kim**

- Apr. 2018 **Top Grade Award**, *Sogang University*, Top 1% in Department of Engineering for the 2nd Semester of 2017.  
**Taeyeong Kim**
- Sep. 2017 **Top Grade Award**, *Sogang University*, Top 1% in Department of Engineering for the 1st Semester of 2017.  
**Taeyeong Kim**
- Apr. 2017 **Top Grade Award**, *Sogang University*, Top 1% in Department of Engineering for the 2nd Semester of 2016.  
**Taeyeong Kim**
- Mar. 2016 **Top Grade Award**, *Sogang University*, Top 1% in Department of Engineering for the 2nd Semester of 2015.  
**Taeyeong Kim**

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## Publications

\* Authors equally contributed to the work

1. **Taeyeong Kim**, Minwoo Choi, Bong Jae Lee, Jungchul Lee. "Liquid refractive index measurements using cavity in silicon via near-infrared interferometry" *Sens. Actuator A-Phys.* **381**, 116078 (2025). doi:10.1016/j.sna.2024.116078
2. **Taeyeong Kim**, Jungchul Lee. "Fabrication of nanoscale stencils through focused ion beam milling and dry transfer of Silicon-on-Nothing membrane with perforations" *Microelectron. Eng.* **289**, 112172 (2024). doi:10.1016/j.mee.2024.112172
3. Minwoo Choi\*, **Taeyeong Kim**\*, Bong Jae Lee, Jaeman Song, Jungchul Lee. "Conformally overlaid ferromagnetic shadow masks for etching and deposition processes" *J. Microelectromech. Syst.* **33**, 2 (2024). doi:10.1109/JMEMS.2024.3350132
4. **Taeyeong Kim**, Jungchul Lee. "Silicon nanoparticles: fabrication, characterization, application and perspectives" *Micro Nano Syst. Lett.* **11**, 18 (2023). doi:10.1186/s40486-023-00184-9
5. **Taeyeong Kim**, Jungchul Lee. "Fabrication and characterization of Silicon-on-Insulator wafers" *Micro Nano Syst. Lett.* **11**, 15 (2023). doi:10.1186/s40486-023-00181-y
6. Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee. "Predicting atomic force microscopy topography from optical microscopes using deep learning" *Adv. Intell. Syst.* **5**, 2200317 (2022). doi: 10.1002/aisy.202200317  
*Selected as an inside back cover*
7. Jaewoo Jeong, **Taeyeong Kim**, Jungchul Lee. "Simulation of Germanium-on-Nothing cavity's morphological transformation using deep learning" *Micro Nano Syst. Lett.* **10**, 22 (2022). doi:10.1186/s40486-022-00164-5
8. **Taeyeong Kim**, Jungchul Lee. "Optimization of deep reactive ion etching for microscale silicon hole arrays with high aspect ratio" *Micro Nano Syst. Lett.* **10**, 12 (2022). doi:10.1186/s40486-022-00155-6

9. Mun Goung Jeong\*, **Taeyeong Kim\***, Bong Jae Lee, Jungchul Lee. "Subsurface imaging of microfabricated silicon membrane–cavity structures using near-infrared interferometry" *Adv. Eng. Mater.* **24**, 10 (2022). doi: 10.1002/adem.202200531  
*Selected as a back cover*
10. Mun Goung Jeong\*, **Taeyeong Kim\***, Bong Jae Lee, Jungchul Lee. "Surrogate model for optimizing annealing duration of self-assembled membrane-cavity structures" *Micro Nano Syst. Lett.* **10**, 6 (2022). doi: 10.1186/s40486-022-00148-5
11. Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee. "PCA-based sub-surface structure and defect analysis for Germanium-on-Nothing using nanoscale surface topography" *Sci. Rep.* **12**, 7205 (2022). doi: 10.1038/s41598-022-11185-w
12. **Taeyeong Kim\***, Juhee Ko\*, Jungchul Lee. "Self-assembled silicon membrane resonator for high vacuum pressure sensing" *Vacuum* **201**, 111101 (2022). doi: 10.1016/j.vacuum.2022.111101
13. Mun Goung Jeong\*, **Taeyeong Kim\***, Bong Jae Lee, Jungchul Lee. "Thick Germanium-on-Nothing structures by annealing microscale hole arrays with straight sidewall profiles" *J. Microelectromech. Syst.* **31**, 2 (2022). doi: 10.1109/JMEMS.2021.3139094
14. **Taeyeong Kim\***, Mun Goung Jeong\*, Bong Jae Lee, Jungchul Lee. "Formation, evolution, and prevention of thermally induced defects on germanium and silicon upon high-temperature vacuum annealing" *J. Vac. Sci. Technol. A* **39**, 060403 (2021). doi: 10.1116/6.0001308
15. **Taeyeong Kim\***, Dong Min Kim\*, Bong Jae Lee, Jungchul Lee. "Soft and Deformable Sensors Based on Liquid Metals" *Sensors* **19**, 19 4250 (2019). doi: 10.3390/s19194250

## Patents

- Aug. 2024 **Particle manufacturing method and particle manufacturing device**  
Jungchul Lee, **Taeyeong Kim** / Korean Patent, 10-2024-0108939
- Apr. 2023 **Top-down fabrication of single crystal silicon nanoparticles**  
Jungchul Lee, **Taeyeong Kim** / Korean Patent, 10-2023-0051962
- Aug. 2022 **Method of fabricating a cavity wafer**  
Jungchul Lee, Mun Goung Jeong, **Taeyeong Kim**, Bong Jae Lee / Korean Patent, 10-2022-0099653
- Mar. 2022 **Pressure sensing device and pressure sensing method using the same**  
Jungchul Lee, **Taeyeong Kim**, Juhee Ko / Korean Registered Patent, 10-2613766
- Jan. 2022 **Anti-counterfeiting tag, method of manufacturing the anti-counterfeiting tag and anti-counterfeiting system**  
Jungchul Lee, **Taeyeong Kim**, Mun Goung Jeong, Jaewoo Jeong, Bong Jae Lee / Korean Patent, 10-2022-0012563
- May. 2021 **Sensor integration of interferometric and resonance measurement systems for identifying heterogeneous viruses**  
Jungchul Lee, Juhee Ko, **Taeyeong Kim** / Korean Registered Patent, 10-2469917

## Conferences

- Nov. 2024 **2024 Fall Conference of the Society of Micro and Nano Systems**, Busan  
(Poster) **Best Paper Award/Taeyeong Kim**, Jungchul Lee  
-Real-time inspection of semiconductor self-assembly process during high-temperature annealing
- Nov. 2024 **Fall Conference of Korean Society of Mechanical Engineers (KSME)** Jeju Island  
(Oral) **Taeyeong Kim**, Jungchul Lee  
-Selective self-assembly of silicon nano-structures using localized laser annealing
- Oct. 2024 **IEEE Sensors 2024**, Kobe, Japan  
(Oral) **Taeyeong Kim**, Minwoo Choi, Bong Jae Lee, Jungchul Lee  
-Development of microfluidic platform for refractive index measurement of liquid
- Mar. 2024 **The 26th Korean MEMS Conference (KMEMS 2024)**, Jeju Island  
(Oral) **Best Oral Presentation Award/Taeyeong Kim**, Jungchul Lee  
-Top-down fabrication of highly uniform single crystal silicon micro-/nanoparticles via wafer-scale solid jet transfer harvesting
- Nov. 2023 **Fall Conference of Korean Society of Mechanical Engineers (KSME)** Incheon  
(Oral) **Taeyeong Kim**, Juhee Ko, Minwoo Choi, Jaeman Song, Bong Jae Lee, Jungchul Lee  
-Wafer scale ferromagnetic shadow mask for versatile microfabrication
- Sep. 2023 **The 14th Japan-China-Korea Joint Conference on MEMS/NEMS (JCK MEMS/NEMS)**, Jeju, Korea  
(Poster) **Taeyeong Kim**, Minwoo Choi, Bong Jae Lee, Jungchul Lee  
-Self-assembled silicon cavity with polydimethylsiloxane interface for liquid refractive index measurements via near-infrared interferometry
- June. 2023 **The 22nd International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2023)**, Kyoto, Japan  
(Poster) **Taeyeong Kim**, Jungchul Lee  
-Nanoscale stencils fabricated by focused ion beam milling and dry transfer of Silicon-on-Nothing membranes
- May. 2023 **Spring Conference of Korean Society of Mechanical Engineers (KSME) – Micro Nano division**, Busan  
(Poster) **Best Poster Award/Taeyeong Kim**, Juhee Ko, Jungchul Lee  
-Top-down mass production of uniform silicon nanoparticles via high temperature annealing
- Mar. 2023 **The 25th Korean MEMS Conference (KMEMS 2023)**, Jeju Island  
(Oral) **Best Oral Presentation Award/Taeyeong Kim**, Minwoo Choi, Bong Jae Lee, Jungchul Lee  
-Fabrication of silicon-on-insulator structure via simultaneous internal and external oxidation of Silicon-on-Nothing (SON)

- Mar. 2023 **The 25th Korean MEMS Conference (KMEMS 2023)**, Jeju Island  
 (Poster) **Taeyeong Kim**, Jungchul Lee  
 -Top-down fabrication of single crystal silicon nanoparticles based on shape evolution during high temperature annealing
- Jan. 2023 **Nano Convergence Conference 2023 (NCC 2023)**, Gwangju  
 (Poster) **Taeyeong Kim**, Jungchul Lee  
 -Towards advanced optical and electrical devices using nanoscale stencils fabricated by focused ion beam milling and dry transfer of silicon-on-nothing membranes
- Nov. 2022 **2022 Nanoscientific Symposium**, Daejeon  
 (Invited talk) Mun Goung Jeong, **Taeyeong Kim**, Jaewoo Jeong, Jungchul Lee  
 -반도체 박막-공동 구조체를 위한 비파괴 검사 분석 및 해석
- Nov. 2022 **2022 Fall Conference of the Society of Micro and Nano Systems**, Gwangju  
 (Poster) **Best Paper Award/Taeyeong Kim**, Jungchul Lee  
 -Top-down fabrication of single crystal silicon nanoparticles
- Nov. 2022 **Fall Conference of Korean Society of Mechanical Engineers (KSME)** Jeju Island  
 (Oral) **Taeyeong Kim**, Jungchul Lee  
 -Single crystal silicon thin film shadow mask for fabricating nanoscale metal patterns
- Apr. 2022 **Spring Conference of Korean Society of Mechanical Engineers (KSME) – Micro Nano division**, Busan  
 (Poster) **Taeyeong Kim**, Jungchul Lee  
 -Transfer of a monocrystalline silicon thin film on a flexible substrate
- Apr. 2022 **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island  
 (Poster) **Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -3D anti-counterfeiting tag encoding based on multi-layered silicon-on-Nothing structures and decoding with near-IR interferometry
- Apr. 2022 **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island  
 (Poster) **Best Paper Award/** Mun Goung Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -Surrogate model for optimizing annealing duration of self-assembled membrane-cavity structures
- Apr. 2022 **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island  
 (Poster) **Taeyeong Kim**, Juhee Ko, Jungchul Lee  
 -High-vacuum pressure sensor with silicon-on-nothing (SON) membrane resonators
- Apr. 2022 **The 24th Korean MEMS Conference (KMEMS 2022)**, Jeju Island  
 (Poster) **Best Paper Award/Taeyeong Kim**, Jungchul Lee  
 -Optimization of deep reactive ion etching for micrometer and sub-micrometer silicon hole arrays with high aspect ratio
- Jan. 2022 **Nano Convergence Conference 2022 (NCC 2022)**, Gwangju  
 (Oral) **Best Oral Presentation Award/Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -Fabrication of single and double-stacked germanium-on-nothing structure by near-melting temperature annealing

- Jan. 2022 **Nano Convergence Conference 2022 (NCC 2022)**, Gwangju  
 (Poster) Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -Encoder-decoder neural network and PCA-based surface inspection methodology for GON structures
- Nov. 2021 **2021 Fall Conference of the Society of Micro and Nano Systems**, An-myeon Island  
 (Poster) **Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -고온 진공 어닐링을 이용한 자가조립 저매니움 단층 및 복층 공동 제작
- Nov. 2021 **2021 Fall Conference of the Society of Micro and Nano Systems**, An-myeon Island  
 (Poster) **Best Paper Award**/Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -자가 조립 저마늄 구조를 위한 PCA 기반 표면 검사 및 분석 방법론
- Nov. 2021 **Fall Conference of Korean Society of Mechanical Engineers (KSME)**, Gwangju  
 (Oral) **Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -Fabrication of single and double germanium-on-nothing structures using high-temperature vacuum annealing of microscale hole arrays
- Nov. 2021 **Fall Conference of Korean Society of Mechanical Engineers (KSME)**, Gwangju  
 (Oral) Jaewoo Jeong, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -PCA-based sub-surface analysis for Germanium-on-Nothing structures using nanoscale surface micrographs
- May. 2021 **Spring Conference of Korean Society of Mechanical Engineers (KSME) – Thermal Engineering division**, Jeju Island  
 (Poster) **Taeyeong Kim**, Jaewoo Jeong, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -High-resolution image-based silicon and germanium self-assembly cavity transient analysis
- Apr. 2021 **The 23rd Korean MEMS Conference (KMEMS 2021)**, Buyeo  
 (Poster) **Taeyeong Kim**, Mun Goung Jeong, Bong Jae Lee, Jungchul Lee  
 -Transient self-assembled structure analysis for prediction of the cavity formation upon high temperature annealing
- Dec. 2020 **Fall Conference of Korean Society of Mechanical Engineers (KSME)**, Jeongseon  
 (Poster) **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -Flexible liquid metal  $3\omega$  sensor fabricated by shear induced direct printing for thermal conductivity measurement of human skin
- Dec. 2019 **The 2nd Pacific Rim Thermal Engineering Conference (PRTEC)**, Hawaii Maui Island  
 (Oral) Dong Min Kim, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -Thermal conductivity measurement of liquid metal with 3-omega method
- Dec. 2019 **The 2nd Pacific Rim Thermal Engineering Conference (PRTEC)**, Hawaii Maui Island  
 (Oral) J. Kim, **Taeyeong Kim**, Bong Jae Lee, Jungchul Lee  
 -Fabrication of liquid-metal nano-emulsion and characterization of its dispersion stability

Nov. 2019 **Fall Conference of the Korean Society of Mechanical Engineers (KSME)**  
(Poster) **Taeyeong Kim**, Dong Min Kim, Bong Jae Lee, Jungchul Lee  
-Precision measurement of thermal conductivity of artificial skin with liquid metal sensor fabricated by microcontact printing