

# Young-Jun Kim, Ph.D.

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## RESEARCH FOCUSES

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- Biocompatible materials for human health
- Neuromodulation, neurostimulation, nerve conduction block
- Wireless energy transfer for implantable medical devices
- Pathogen control with static electricity
- Energy harvesting for sensor applications

## DEGREE & EDUCATION

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### Postdoctoral Fellow in Medical Engineering

Sep 2025 –

California Institute of Technology (Caltech), Advisor: Prof. Wei Gao

### Postdoctoral Fellow in Advanced Functional Polymers Research Center

Sep 2023 – Jul 2025

Korea Research Institute of Chemical Technology (KRICT), Advisor: Dr. Yun Ho Kim

### Ph.D in Advanced Material Science & Engineering

Mar 2019 – Aug 2023

Sungkyunkwan University (SKKU), Advisor: Prof. Sang-Woo Kim

\* Ph.D. thesis title: Design and Development of Triboelectric Nanogenerator for Pathogen Control and Powering Implantable Device

### B.S. in Mechanical Engineering

Mar 2013 – Feb 2019

Hanyang University (HYU), Advisor: Prof. Se-Jin Yook

## AWARD & HONORS

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- **Sejong Science Fellowship** (Domestic Track, 2024-2029, **100,000,000 KRW/year**)
- PSK-INNOX Young Researcher Award by the Korea Polymer Society of Korea (2024)
- Samsung Humantech Silver Medal (2023)
- The Best Outstanding Master/Ph.D Student Award, BK21 Program (2022)
- Best Presentation Award (NCC 2022)
- Excellent Student Presentation Award (ECS 242<sup>nd</sup> Meeting, 2022)
- SKKU Research Matters (2021)
- SKKU Best Paper Award (2021)
- Best Paper Award (PVSEC-30 & GPVC 2020)
- Energy Technology Innovation Ideas (Ministry of Commerce Industry and Energy, 2019)
- Outstanding Poster Presentation Award (12th TBIS, 2019)

## PUBLICATIONS

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### PEER-REVIEWED JOURNALS

Notes: # indicates equally contributing authors. \* indicates the corresponding author(s).

#### First Authored Papers

1. **Y.-J. Kim#**, Y. Chung#, J.-H. Hwang, J.-M. Jeong, B. Kim, D. Kang, B.-O. Choi, H.-J. Yoon\*, S.-W. Kim\*, Acoustic Impedance Mismatching for Efficient Ultrasound Energy Harvesting Using Triboelectric Nanogenerators, *Advanced Energy Materials*, in press
2. **Y.-J. Kim#**, S.-H. Kim#, B.-J. Park#, J. Jeon, D. Kang, Y. Chung, J.-H. Hwang, H.-J. Yoon, K. H. Lee\*, B.-O. Choi\*, S.-W. Kim\*, [Wireless and bioresorbable triboelectric nerve block system for postoperative pain control](#), *Nature Biomedical Engineering* (2026), Covered by ScienMag, Bioengineer, and domestic news
3. I.-Y. Suh, **Y.-J. Kim#**, S.-W. Kim\*, [Portable hand-powered nanocatalysis for clean water](#), *Nature Nanotechnology* (2025)
4. **Y.-J. Kim#**, J. Hwang#, B.-J. Park, Y. Chung, S. H. Choi, S.-H. Kim, D. H. Park, Y. Lee, S. Yoo, J. Park, J. C. Won, S. H. Nam, B.-O. Choi, S.-W. Kim\*, Y. H. Kim\*, [Nanoparticle-Stabilized Porous Composite Architectures for Ultrasound-Driven Triboelectric Energy Harvesters in Soft Implantable Electronics](#), *ACS Nano* 19, 40994–41003 (2025)
5. N. G. Kim#, J. M. Jang#, **Y.-J. Kim#**, J. Y. Kim, D. Kang, J. Park, J. C. Won, S.-W. Kim, D. W. Kim, S. J. Kim, Y. H. Kim, [Scalable and Eco-friendly Production of Flexible, Hierarchical Porous MXene/Polyimide Composites with Superior Electromagnetic Interference Shielding](#), *Composites Part B: Engineering* 304, 112805 (2025)
6. Y. Chung#, H. Yuan#, Z. Wang, J.-M. Jeong, B.-J. Park, J.-H. Hwang, S.-J. Suh, B.-O. Choi, H. Park, **Y.-J. Kim\***, K. Dai\*, S.-W. Kim\*, [Acoustic Tunable Battery-Free Implants Based on Sustainable Triboelectric Nanogenerators with Metal-Polymer Intermixing Layers](#), *Advanced Energy Materials* 15, 2403712 (2025), selected as a cover image of the journal issue
7. **Y.-J. Kim#**, Z.-Y. Huo#\*, H. Dai, D.-M. Lee, I.-Y. Suh, J.-H. Hwang, Y. Chung, H. Y. Lee, Y. Du, W. Ding, X. Wang, S.-W. Kim\*, [Body-coupled energy enabling unrestricted microbial disinfection using polymer nanorods](#), *Nature Water* 2, 360-369 (2024), Covered by News & Views in *Nature Water*, Highlighted in *Nature* 628, 693 (2024)
8. **Y.-J. Kim#**, J. Lee#, J.-H. Hwang#, Y. Chung, B. J. Park, J. Kim, S.-H. Kim, H.-J. Yoon, S.-M. Park\*, S.-W. Kim\*, [High-performing and capacitive-matched triboelectric implants driven by ultrasound](#), *Advanced Materials* 36, 2307194 (2024), Covered by *Forbes*, *Parkinson's News Today*, *News-medical*, etc.
9. I.-Y. Suh#, **Y.-J. Kim#**, B.-Q. Chen, P. Zhao, D. S. Cho, M. Kang, Z.-Y. Huo\*, S.-W. Kim\*, [Self-powered microbial blocking textile driven by triboelectric charges](#), *Nano Energy* 110, 108343 (2023)
10. **Y.-J. Kim#**, H. T. Kim#, J. H. Lee#, I.-Y. Suh, S.-W. Kim\*, [Self-powered Fine Dust Filtration System Using Triboelectrification Induced Electric Field](#), *Nanoscale Research Letters* 17, 1-9 (2022)
11. M. Kang#, N.-Y. Jang#, **Y.-J. Kim#**, H.-J. Ro#, D. Kim, Y. Kim, H. T. Kim, H. M. Kwon, J.-H. Ahn, B.-O. Choi, N.-H. Cho\*, and S.-W. Kim\*, [Virus blocking textile for SARS-CoV-2 using human body triboelectric energy harvesting](#), *Cell Reports Physical Science* 3, 100813 (2022)
12. Z.-Y. Huo#, **Y.-J. Kim#**, I.-Y. Suh, D.-M. Lee, J. H. Lee, Y. Du, S. Wang, H.-J. Yoon, and S.-W. Kim\*, [Triboelectrification induced self-powered microbial disinfection using nanowire-enhanced localized electric field](#), *Nature Communications* 12, 1-11 (2021) Covered by domestic news (*Dong-A Ilbo*, etc.)

#### Contributing Authored Papers

13. Y. Lee, **Y.-J. Kim**, D. H. Park, I. Park, D. Kim, S. B. Kim, [Compact electroaerodynamic dust removal through integrated ion transport mechanisms](#), *Separation and Purification Technology* 386, 136559 (2026)
14. Y. Chung, S. Choudhury, **Y.-J. Kim**, I.-Y. Suh, K. Dai, S.-W. Kim, [Ultrasound-Powered, Battery-Free](#)

- [Implants via Triboelectric Energy Harvesting](#), *Advanced Materials Technologies* early view, e01451 (2025)
15. Z.-Y. Huo, **Y.-J. Kim**, S.-W. Kim, [Contact electrification-induced personal sanitation](#), *Nature Reviews Clean Technology* (2025)
  16. D. Kang#, B.-J. Park#, J.H. Hwang#, **Y.-J. Kim**, S.-H. Kim, H. W. Kim, K. J. Yu, J. Jeon, H. Y. Lee, Y. Chung, S. H. Nam, B.-O. Choi, S.-W. Kim, [In-body current path manipulation with minimal attenuation](#), *Science Advances* 11, eadx5922 (2025)
  17. D. Kim#, Y. Kwon#, Y. So, **Y.-J. Kim**, S. W. Park, H. Park, J. Hwang, J. Park, C. Kim, J. C. Won, J. H. Kim\*, Y. H. Kim\*, [Water-Borne Fluorinated Polyimide Dielectric for Large-Area IGZO Transistors and Logic Gates](#), *ACS Applied Materials & Interfaces* 16, 68328-68335 (2024)
  18. Y. Chung#, J.-M. Jeong#, J.-H. Hwang#, **Y.-J. Kim**, B.-J. Park, D. S. Cho, Y. Cho, S. J. Suh, B.-O. Choi, H. Park\*, H.-J. Yoon\*, S.-W. Kim\*, [Gigantic triboelectric power generation overcoming acoustic energy barrier using metal-liquid coupling](#), *Joule* 8, 1-15 (2024)
  19. M. Kang#, H. Yum#, H. T. Kim#, B. J. Park, Y. Choi, H. J. Kim, Y. Cho, **Y.-J. Kim**, D.-M. Lee, D.-G. Lee, H.-C. Song, S. H. Nam, J. H. Lee\*, B.-O. Choi\*, S.-W. Kim\*, [Self-Powered Electrical Bandage Based on Body-Coupled Energy Harvesting](#), *Advanced Materials* 36, 2402491 (2024)
  20. I.-Y. Suh#, Z.-Y. Huo#\*, J.-H. Jung#, D. Kang, D.-M. Lee, Y.-J. Kim, B. Kim, J. Jeon, P. Zhao, J. Shin, S. Kim, S.-W. Kim\*, [Highly efficient microbial inactivation enabled by tunneling charges injected through two-dimensional electronics](#), *Science Advances* 10, eadl5067 (2024)
  21. J. Kim#, D.-M. Lee#, H. Ryu, **Y.-J. Kim**, H. Kim, H.-J. Yoon, M. Kang, S. S. Kwak\*, S.-W. Kim\*, [Triboelectric Nanogenerators for Battery-Free Wireless Sensor System Using Multi-Degree of Freedom Vibration](#), *Advanced Materials Technologies* 9, 2301427 (2024)
  22. D. Kang#, J.-H. Hwang#, **Y.-J. Kim**, Z. Pin, H. Y. Lee, J. Kim, M. S. Shin, S. Jeon, S. Kim, S.-W. Kim\*, [Contact electrification controlled by material deformation-induced electronic structure changes](#), *Materials Today* 72, 109-116 (2023)
  23. B. Kim#, H.-J. Yoon#, **Y.-J. Kim**, B.-J. Park, J.-H. Jung, S.-W. Kim\*, [Ultrasound-Driven Triboelectric Nanogenerator with Biocompatible 2-Hydroxyethyl Methacrylate](#), *ACS Energy Letters* 8, 3412 (2023)
  24. Z.-Y. Huo, **Y.-J. Kim**, Y. Chen, Y. Du, D. Xia, S.-W. Kim\*, Q. Yuan\*, [Hybrid energy harvesting systems for self-powered sustainable water purification by harnessing ambient energy](#), *Frontiers of Environmental Science & Engineering* 17, 118 (2023) (review articles)
  25. X. Meng#, X. Xiao#, S. Jeon, D. Kim, B.-J. Park, **Y.-J. Kim**, N. Rubab, S. Kim, S.-W. Kim\*, [An Ultrasound-Driven Bioadhesive Triboelectric Nanogenerator for Instant Wound Sealing and Electrically Accelerated Healing in Emergencies](#), *Advanced Materials* 35, 2209054 (2023)
  26. I. M. Imani#, B. Kim#, X. Xiao, N. Rubab, B.-J. Park, **Y.-J. Kim**, P. Zhao, M. Kang, S.-W. Kim\*, [Ultrasound-Driven On-Demand Transient Triboelectric Nanogenerator for Subcutaneous Antibacterial Activity](#), *Advanced Science* 10, 2204801 (2023)
  27. B.-G. Park#, C. Lee#, **Y.-J. Kim**, J. Park, H. Kim, Y. Jung, J. S. Ko, S.-W. Kim, J.-H. Lee\*, H. Cho\*, [Toxic micro/nano particles removal in water via triboelectric nanogenerator](#), *Nano Energy* 100, 107433 (2022)
  28. M. Kang#, M. S. B. Khusrin#, **Y.-J. Kim**, B. Kim, B.-J. Park, I. Hyun, I. M. Imani, B.-O. Choi, S.-W. Kim\*, [Nature-derived highly tribopositive  \$\alpha\$ -carrageenan-agar composite-based fully biodegradable triboelectric nanogenerators](#), *Nano Energy* 100, 107480 (2022)
  29. Z.-Y. Huo#, D.-M. Lee#, J.-M. Jeong#, **Y.-J. Kim**, J. Kim, I.-Y. Suh, P. Xiong, S.-W. Kim\*, [Microbial Disinfection with Supercoiling Capacitive Triboelectric Nanogenerator](#), *Advanced Energy Materials* 12, 2103680 (2022)
  30. D.-M. Lee#, N. Rubab#, I. Hyun, W. Kang, **Y.-J. Kim**, M. Kang, B. O. Choi\*, S.-W. Kim\*, [Ultrasound-mediated triboelectric nanogenerator for powering on-demand transient electronics](#), *Science Advances* 8, eabl8423 (2022)
  31. Z.-Y. Huo, D.-M. Lee, **Y.-J. Kim**, and S.-W. Kim\*, [Solar-induced hybrid energy harvesters for advanced](#)

[oxidation water treatment](#), *iScience* 24, 102808 (2021) (review articles)

32. Z.-Y. Huo, D.-M. Lee, S. Wang, **Y.-J. Kim**, and S.-W. Kim\*, [Emerging Energy Harvesting Materials and Devices for Self-Powered Water Disinfection](#), *Small Methods* 5, 2100093 (2021) (review articles)
33. H.-J. Yoon#, D.-M. Lee#, **Y.-J. Kim**, S. Jeon, J.-H. Jung, S. S. Kwak, J. Kim, S. Kim, Y. Kim, and S.-W. Kim\*, [Mechanoreceptor-Inspired Dynamic Mechanical Stimuli Perception based on Switchable Ionic Polarization](#), *Advanced Functional Materials* 31, 2100649 (2021)

## PATENTED TECHNOLOGY TRANSFER

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1. KR Application No. 10-2020-0062731, No. 10-2020-0140031, **SEMS Co., Ltd., (85,000,000 KRW)**
2. KR Application No. 10-2020-0099247, **SEMS Co., Ltd., (58,000,000 KRW)**
3. KR Application No. 10-2020-0056913, US Application No. 17/110,673, **SEMS Co., Ltd., (79,000,000 KRW)**
4. KR Application No. 10-2020-0145170, US Application No. 17/510,675 **Energymining Co., Ltd., (300,000,000 KRW)**
5. KR Application No. 10-2024-0137352, No. 10-2023-0159093, **Edge Foundry Co. Ltd., (55,000,000 KRW)**

## PATENTS:

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	Application (KOREA)	Registration (KOREA)	Application (US)	Registration (US)
Patent (#)	6	24	7	5

## REFERENCES:

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### Prof. Sang-Woo Kim, Ph.D. (Ph.D. supervisor)

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