

CURRICULUM VITAE

Daeshik Kang

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San 5, Woncheon-Dong, Yeongtong-Gu, Suwon 443-749, Korea

PERSONAL INFORMATION

Name: Daeshik Kang
Date of Birth: December 2, 1981
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EDUCATION

Doctor of Philosophy (March 2009 ~ August 2014)

School of Mechanical and Aerospace Engineering, Seoul National University

Advisor: Prof. Mansoo Choi / Prof. Kahp-Yang Suh

Thesis: Bio-inspired design and fabrication for high sensitive recognition system

Bachelor of Science (March 2002 ~ February 2007)

Department of Physics, Seoul National University [major]

School of Mechanical and Aerospace Engineering, Seoul National University [minor]

EXPERIENCE

2014.9 ~ 2016.2 Postdoctoral Research Associate, Material Science and Engineering,
University of Illinois at Urbana-Champaign, USA
(Advisor: Prof. John A. Rogers)
2011.10 ~ 2012.3 Visiting Scholar, School of Bioengineering, U.C. Berkeley, USA
(Advisor: Prof. Luke P. Lee)

HONORS AND AWARDS

1. Excellent research professor, Ajou Publication Awards, 2021
2. Excellent research professor, Ajou Publication Awards, 2020
3. Excellent research professor, Ajou Publication Awards, 2019
4. Silver Prize, Ajou Publication Awards, 2017
5. Best Paper Award, KMEMS, 2016
6. National R&D Excellence Top 100, Korea, 2015

7. Best Paper Award, KMEMS, 2015
8. Outstanding Doctoral Dissertation Award, Seoul National University, 2015
9. Long-term Studying Abroad Scholarship Award, Seoul National University, 2011~2012
10. A Gold Prize of Samsung Human-tech, Samsung Electronics, 2011
11. Superior Academic Performance Scholarship, Seoul National University, 2009
12. Superior Academic Performance Scholarship, Seoul National University, 2003~2006

RESEARCH INTERESTS

- Bio-inspired Approach for Highly Sensitive Systems
- Foldable Electronics for Highly Packable Systems
- Multiscale Platforms for Biological Applications

PATENTS

1. **D. Kang**, A. Koh, Y. Liu, X. Huang and J. A. Rogers, "Devices and Related Methods for Epidermal Characterization of Biofluids", (PCT/US2015/044638).
2. **D. Kang**, Y. W. Choi, C. S. Lee, K. Y. Suh, T. I. Kim and M. S. Choi, "Highly sensitive sensor comprising cracked conductive thin film and process for preparing same", (PCT/KR2013/012081).
3. K. Y. Suh, C. Pang, T.-I. Kim, **D. Kang**, and S. M. Kim, "Reversible electric connector using interlocking of fine cilium and multifunctional sensor using the same, and method of manufacturing sensor having multiple functions using the same", (PCT/KR2012/4228).

PUBLICATIONS

41. D. Kim, M. Gwon, B. Kim, V. M. Ortega-Jimenez, S. Han, **D. Kang**, M. S. Bhamla, J. Koh "Design of a Biologically Inspired Water-Walking Robot Powered by Artificial Muscle" *Micromachines* (2022)
40. D. Kim, B. Kim, B. Shin, D. Shin, C. Lee, J. Chung, J. Seo, Y. Kim, G. Sung, W. Seo, S. Kim, S. Hong, S. Hwang, S. Han, **D. Kang**, H. Lee, J. Koh "Actuating compact wearable augmented reality devices by multifunctional artificial muscle" *Nature Communications* (2022)
39. J., D. Kim, Y. Song, S. Lee, B. Yeom, J. Huh, S. Han, **D. Kang**, J. Koh, J. Cho "High-performance electrified hydrogel actuators based on wrinkled nanomembrane electrodes for untethered insect-scale soft aquabots" *Science Robotics* (2022)
38. D. Lim, I. Hong, S. U. Park, J. W. Chae, S. Lee, H. W. Baac, C. Shin, J. Lee, Y. Roh, C. Im, Y. Park, G. Lee, U. Kim, J. Koh, **D. Kang**, S. Han, S. M. Won "Functional Encapsulating Structure for Wireless and Immediate Monitoring of the Fluid Penetration" *Advanced Functional Materials* (2022)
37. J. Choi, S. Han, M. Baliwag, B. H. Kim, H. Jang, J. Kim, I. Hong, T. Kim, S. M. Kang, Lee, **D. Kang**, J. A. Rogers "Artificial stretchable armor for skin-interfaced wearable devices and soft robotics" *Extreme Mechanics Letters* (2022)

36. Y. Roh, M. Kim, S. M. Won, D. Lim, I. Hong, S. Lee, T. Kim, C. Kim, D. Lee, S. Im, G. Lee, D. Kim, D. Shin, D. Gong, B. Kim, S. Kim, S. Kim, H. K. Kim, B. Koo, S. Seo, J. Koh, **D. Kang**, S. Han "Vital signal sensing and manipulation of a microscale organ with a multifunctional soft gripper" *Science Robotics* (2022)
35. M. Gwon, G. Park, D. Hong, Y. Park, S. Han, **D. Kang**, J. Koh "Soft directional adhesion gripper fabricated by 3D printing process for gripping flexible printed circuit boards" *International Journal of Precision Engineering and Manufacturing-Green Technology* (2022)
34. D. Kim, S. Han, T. Kim, C. Kim, D. Lee, **D. Kang**, J. Koh "Design of a Sensitive Balloon Sensor for Safe Human–Robot Interaction." *Sensors* (2021)
33. C. Kim, G. Kim, Y. Lee, G. Lee, S. Han, **D. Kang**, S. H. Koo, J. Koh, "Shape memory alloy actuator-embedded smart clothes for ankle assistance." *Smart Materials and Structures* (2020)
32. J. Ko, D. Kim, Y. Song, S. Lee, M. Kwon, S. Han, **D. Kang**, Y. Kim, J. Huh, J. Koh, J. Cho "Electroosmosis-Driven Hydrogel Actuators Using Hydrophobic/Hydrophilic Layer-By-Layer Assembly-Induced Crack Electrodes." *ACS nano* (2020)
31. G. Lee, M. Kim, Y. W. Choi, N. Ahn, J. Jang, J. Yoon, S. M. Kim, J. Lee, **D. Kang**, H. S. Jung, M. Choi, "Ultra-flexible perovskite solar cells with crumpling durability: toward a wearable power source." *Energy & Environmental Science* (2019)
30. J. Park, M. Kim, I. Hong, T. Kim, E. Lee, E. Kim, J. Ryu, Y. Jo, J. Koo, S. Han, J. Koh, **D. Kang**, "Foot Plantar Pressure Measurement System Using Highly Sensitive Crack-Based Sensor." *Sensors* (2019)
29. G. Lee, Y. W. Choi, T. Lee, K. S. Lim, J. Shin, T. Kim, H. K. Kim, B.-K. Koo, H. B. Kim, J.-G. Lee, K. Ahn, E. Lee, M. S. Lee, J. Jeon, H. S. Yang, P. Won, S. Mo, N. Kim, M. H. Jeong, Y. Roh, S. Han, J.-S. Koh, S. M. Kim, **D. Kang**, M. Choi, "Nature-inspired rollable electronics." *NPG Asia Materials* (2019)
28. J. Kim, J. Leem, H. N. Kim, P. Kang, J. Choi, F. Haque, **D. Kang**, S. W. Nam, "Uniaxially crumpled graphene as a platform for guided myotube formation." *Microsystems & Nanoengineering* (2019)
27. B. Park, J. U. Kim, J. Kim, D. Tahk, C. Jeong, J. Ok, J. H. Shin, **D. Kang**, T. Kim, "Strain-Visualization with Ultrasensitive Nanoscale Crack-Based Sensor Assembled with Hierarchical Thermochromic Membrane." *Advanced Functional Materials* (2019)
26. K. Lee*, **D. Kang***, H. J. Park, D. H. Park, S. Han, "Design of Polarization-Independent and Wide-Angle Broadband Absorbers for Highly Efficient Reflective Structural Color Filters." *Materials* (2019)

25. I. Hong, Y. Roh, J. Koh, S. Na, T. Kim, E. Lee, H. An, J. Kwon, J. Yeo, S. Hong, K. Lee, **D. Kang**, S. Ko, S. Han, "Semipermanent Copper Nanowire Network with an Oxidation-Proof Encapsulation Layer." *Advanced Materials Technologies* (2019)
24. M. Kim, H. Choi, T. Kim, I. Hong, Y. Roh, J. Park, S. Seo, S. Han, J. Koh, **D. Kang**, "FEP Encapsulated Crack-Based Sensor for Measurement in Moisture-Laden Environment." *Materials* (2019)
23. B. H. Kim, J. Lee, S. M. Won, Z. Xie, J.-K. Chang, Y. Yu, Y. K. Cho, H. Jang, J. Y. Jeong, Y. Lee, A. Ryu, D. H. Kim, K. H. Lee, J. Y. Lee, F. Liu, X. Wang, Q. Huo, S. Min, D. Wu, B. Ji, A. Banks, J. Kim, N. Oh, H. M. Jin, S. Han, **D. Kang**, C. H. Lee, Y. M. Song, Y. Zhang, Y. Huang, K.-I. Jang, J. A. Rogers, "Three-Dimensional Silicon Electronic Systems Fabricated by Compressive Buckling Process", *ACS Nano* (2018)
22. E. Lee, T. Kim, H. Suh, M. Kim, P. V. Pikhitsa, S. Han, J.-s. Koh, **D. Kang**, "Effect of Metal Thickness on the Sensitivity of Crack-Based Sensors", *Sensors* (2018)
21. S. Han, J. Kim, S. M. Won, Y. Ma, **D. Kang**, Z. Xie, K.-T. Lee, H. U. Chung, A. Banks, S. Min, S. Y. Heo, C. R. Davies, J. W. Lee, C.-H. Lee, B. H. Kim, K. Li, Y. Zhou, C. Wei, X. Feng, Y. Huang, J. A. Rogers, "Battery-free, wireless sensors for full-body pressure and temperature mapping", *Science Translational Medicine* (2018)
20. T. Kim, T. Lee, G. Lee, Y. W. Choi, S. M. Kim, **D. Kang**, M. Choi, "Polyimide Encapsulation of Spider-Inspired Crack-Based Sensors for Durability Improvement", *Applied Science* (2018)
19. B. Park, S. Lee, H. Choi, J. U. Kim, H. Hong, C. Jeong, **D. Kang**, T.-il Kim, "A semi-permanent and durable nanoscale-crackbased sensor by on-demand healing", *Nanoscale* (2018)
18. G. Lee, T. Lee, Y. W. Choi, P. V. Pikhitsa, S. J. Park, S. M. Kim, **D. Kang**, M. Choi, "Metal–elastomer bilayered switches by utilizing the superexponential behavior of crack widening", *Journal of Materials Chemistry C* (2017)
17. T. Lee, Y. W. Cho, G. Lee, S. M. Kim, **D. Kang**, M. Choi, "Crack-based strain sensor with diverse metal films by inserting an inter-layer", *RSC Advances* (2017)
16. J. Choi, Y. Xue, W. Xia, T. R. Ray, J. T. Reeder, A. J. Bhandodkar, **D. Kang**, S. Xu, Y. Huang, J. A. Rogers, "Soft, skin-mounted microfluidic systems for measuring secretory fluidic pressures generated at the surface of the skin by eccrine sweat glands", *Lab on a Chip* (2017)
15. B. H. Kim, J.-H. Kim, L. Persano, S.-W. Hwang, S. Lee, J. Lee, Y. Yu, Y. Kang, S. M. Won, J. Koo, Y. K. Cho, G. Hur, A. Banks, J.-K. Song, P. Won, Y. M. Song, K.-I. Jang, **D. Kang**, C. H. Lee, D. Pisignano, J.

- A. Rogers, "Dry Transient Electronic Systems by Use of Materials that Sublime", *Advanced Functional Materials* (2017)
14. J. Choi*, **D. Kang***, S. Han, S. B. Kim, J. A. Rogers, "Thin, Soft, Skin-Mounted Microfluidic Networks with Capillary Bursting Valves for Chrono-Sampling of Sweat", *Advanced Healthcare Materials* (2017)
13. Y. W. Choi, **D. Kang**, P. V. Pikhitsa, T. Lee, S. M. Kim, G. Lee, D. Tahk, M. Choi, "Ultra-sensitive Pressure sensor based on guided straight mechanical cracks", *Scientific Reports* (2017)
12. H. N. Kim, K.-J. Jang, J.-Y. Shin, **D. Kang**, S. M. Kim, I. Koh, Y. Hong, S. Jang, M. S. Kim, B.-S. Kim, H. E. Jeong, N. L. Jeon, P. Kim, K.-Y. Suh, "Artificial Slanted Nanocilia Array as a Mechanotransducer for Controlling Cell Polarity", *ACS Nano* (2017)
11. Y. Xuea, **D. Kang**, Y. Ma, X. Fengd, J. A. Rogers, Y. Huang, "Collapse of microfluidic channels/reservoirs in thin, soft epidermal devices", *Extreme Mechanics Letters* (2016)
10. A. Koh*, **D. Kang***, Y. Xue, S. Lee, R. M. Pielak, J. Kim, T. Hwang, S. Min, A. Banks, P. Bastien, M. C. Manco, L. Wang, K. R. Ammann, K.-I. Jang, P. Won, S. Han, U. Paik, M. J. Slepian, G. Balooch, Y. Huang, J. A. Rogers, "Skin-Like, Wearable Microfluidic Systems Capable of Capture, Storage and Colorimetric Sensing of Sweat", *Science Translational Medicine* (2016)
9. T. Lee, Y. W. Choi, G. Lee, P. V. Pikhitsa, **D. Kang**, S. M. Kim, M. Choi, "Transparent ITO mechanical crack-based pressure and strain sensor", *Journal of Materials Chemistry C* (2016)
8. B. Park, J. Kim, **D. Kang**, C. Jeong, K. Su Kim, J. U. Kim, P. J. Yoo, T. Kim, "Dramatically Enhanced Mechanosensitivity and Signal-to-Noise Ratio of Nanoscale Crack-Based Sensors: Effect of Crack Depth", *Advanced Materials* 28 (37), 8130 (2016)
7. S. M. Kim, J. Kim, S. M. Kang, S. Jang, **D. Kang**, S. E. Moon, H. N. Kim, H. Yoon, "Directional Clustering of Slanted Nanopillars by Elastocapillarity", *Small*, 12 (28), 3764 (2016)
6. C. H. Lee, Y. Ma, K. Jang, A. Banks, T. Pan, X. Feng, J. S. Kim, **D. Kang**, M. S. Raj, B. L. McGrane, B. Morey, X. Wang, R. Ghaffari, Y. Huang, J. A. Rogers, "Soft core/shell packages for stretchable electronics", *Advanced Functional Materials* 25 (24), 3698 (2015)
5. **D. Kang**, P. V. Pikhitsa, Y. W. Choi, C. Lee, S. S. Shin, L. Piao, B. Park, K.-Y. Suh, T.-I. Kim, M. Choi, "Ultrasensitive mechanical crack-based sensor inspired by the spider sensory system" *Nature* 516, 222 (2014)

4. **D. Kang**, C. H. Pang, S. M. Kim, H. S. Cho, H. S. Um, Y. W. Choi, K. Y. Suh “Shape-Controllable Microlens Arrays via Direct Transfer of Photocurable Polymer Droplets” *Advanced Materials* 24 (13), 1709 (2012)
3. C. Pang, **D. Kang**, T.-I. Kim, K. Y. Suh, “Analysis of preload-dependent reversible mechanical interlocking using beetle-inspired wing locking device” *Langmuir* 28 (4), 2181 (2012)
2. C. Pang, T.-i. Kim, W. G. Bae, **D. Kang**, S. M. Kim, K. Y. Suh, “Bioinspired Reversible Interlocker Using Regularly Arrayed High Aspect-Ratio Polymer Fibers” *Advanced Materials* 24 (4), 475 (2012) [front cover]
1. H. Yoon, S.-G. Oh, **D. Kang**, J. M. Park, S. J. Choi, K. Y. Suh, K. Char, H. H. Lee “Arrays of Lucius microprisms for directional allocation of light and autostereoscopic three-dimensional displays” *Nature Communications* 2, 455 (2011)

CONFERENCES

10. **D. Kang**, A. Koh, Y. Xue, S. Lee, J. Kim, Y. Huang, and J. A. Rogers. “Wearable Microfluidics System for Healthcare Monitoring”, Korean MEMS Conference, Jeju, Korea (April 7-9, 2016)
9. **D. Kang**, P. V. Pikhitsa, Y. W. Choi, T.-I. Kim, M. Choi and K.-Y. Suh, “Spider sensory organ inspired ultrasensitive crack sensor”, Korean MEMS Conference, Jeju, Korea (April 2-4, 2015)
8. **D. Kang**, and K. -Y. Suh, “Shape-controllable Microlens Arrays via Direct Transfer of Photo-curable Polymer Droplets for Sub-wavelength Imaging”, Nano-Bio Sensing, Imaging & Spectroscopy, Jeju, Korea (February 20-23, 2013)
7. **D. Kang**, Y. W. Choi, and K. Y. Suh, “Bio-inspired, Shape-controllable Micro-lens Arrays Via Direct Transfer of Photo-curable Polymer Droplets for Sub-wavelength Imaging”, International Symposium on Nature-Inspired Technology, Kangwon, Korea (January 6-9, 2013).
6. **D. Kang**, and K. Y. Suh, “Shape-controllable Microlens Arrays via Direct Transfer of Photo-curable Polymer Droplets for Sub-wavelength Imaging”, MRS Spring Meeting & Exhibit, San Francisco, USA (April 9-13, 2012)
5. **D. Kang**, and K. Y. Suh, “Simple Shape-controllable Fabrication Method of Micro-lens Arrays for Sub-wavelength Imaging”, International Conference of Manufacturing Technology Engineers, Seoul, Korea (October 18-19, 2012)
4. **D. Kang**, C. Pang, S. M. Kim, and K. Y. Suh “Real-time nano optical imaging with micro-lens arrays”, 5th TU-SNU-UT Joint Workshop, Beijing, China (June 7-8, 2011)

3. C. Pang, **D. Kang**, S. M. Kim, W. G. Bae, and K.-Y. Suh, “Bio-inspired Reversible Nano-interlocker with Interfacial Model and Multifunctional, Flexible, Real-time Mechano-Sensor Application”, Pioneer Nano Seoul Forum, Seoul, Korea (November 2, 2011)

2. C. Pang, **D. Kang**, S. M. Kim, and K. Y. Suh, “Bio-inspired Reversible Nano-interlocker for Multifunctional Layered Sensor”, Adhesion Science of Gordon-kenan Research Seminar, Lewiston, USA (July 23-24, 2011)

1. W. G. Bae, J. H. Choi, S. H. Lee, **D. Kang**, K. W. Jung, K.-Y. Suh, “Centering mechanism for micro vessel robot using micropatterned shape memory polymers”, The 2010 3rd IEEE RAS and EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), Tokyo, Japan (September 26-29, 2010)