

Sangwoo Shin

| | | |
|-------------------------------|---|---|
| CONTACT INFORMATION | Department of Mechanical Engineering, University of Hawaii at Manoa, Honolulu, HI 96822 | <i>E-mail:</i> sangwoos@hawaii.edu <i>Web:</i> www.sangwooshin.com <i>Phone:</i> 1-(808) 956-3679 |
| CURRENT POSITION | University of Hawaii at Manoa , Honolulu, HI Assistant Professor , Department of Mechanical Engineering | |
| EDUCATION | Yonsei University , Seoul, Korea Ph.D., Mechanical Engineering, 2012 <ul style="list-style-type: none">• Heat/mass transfer, Energy management, Nanomaterials, Nanofluidics• Thesis: <i>Thermal Management of Energy Devices using Nanostructured Materials</i>• Advisor: Hyung Hee Cho B.S., Mechanical Engineering, 2005 | |
| PROFESSIONAL EXPERIENCE | Assistant Professor Department of Mechanical Engineering, University of Hawaii at Manoa | 2017–current |
| | Postdoctoral Research Associate Department of Mechanical and Aerospace Engineering, Princeton University (Supervisor: Howard A. Stone) | 2013–2016 |
| | Postdoctoral Research Associate Low Observable Research Center, Yonsei University (Supervisor: Hyung Hee Cho) | 2012–2013 |
| REFEREED JOURNAL PUBLICATIONS | Google Scholar profile: https://scholar.google.com/citations?user=ZNZtyqcAAAAJ (* denotes equal contribution; underline denotes advisees) <ol style="list-style-type: none">1. S. Shin, J. T. Ault, K. Toda-Peters & A. Q. Shen, Particle trapping in merging flow junctions by fluid–solute–colloid–boundary interactions, <i>Phys. Rev. Fluids</i>, in press.2. T. J. Shimokusu, V. G. Maybruck, J. T. Ault & S. Shin, Colloid separation by CO₂-induced diffusiophoresis, <i>Langmuir</i>, in press. (<i>Invited article</i>)3. S. Shin, <u>V. S. Doan</u> & J. Feng, Osmotic delivery and release of lipid-encapsulated molecules via sequential solution exchange. <i>Phys. Rev. Appl.</i>, 12 024014 (2019).4. S. Battat, J. T. Ault, S. Shin, S. Khodaparast & H. A. Stone, Particle entrainment in dead-end pores by diffusiophoresis, <i>Soft Matter</i>, 15 3879–3885 (2019).5. J. T. Ault, S. Shin & H. A. Stone, Characterization of surface-solute interactions by diffusioosmosis, <i>Soft Matter</i>, 15 1582–1596 (2019).6. P. B. Warren, S. Shin & H. A. Stone, Diffusiophoresis in ionic surfactants: effect of micellization, <i>Soft Matter</i>, 15 278–288 (2019).7. J. T. Ault, S. Shin & H. A. Stone, Diffusiophoresis of colloidal particles in narrow channel flows, <i>J. Fluid Mech.</i>, 854, 420–448 (2018). | |

8. **S. Shin***, G. Choi*, B. Rallabandi, D. Lee, D. I. Shim, B. S. Kim, K. M. Kim & H. H. Cho, Enhanced boiling heat transfer using self-actuated nano-bimorphs, *Nano Lett.*, **18**, 6392–6396 (2018). (*Featured in **Phys.org.***)
9. F. Yang, **S. Shin** & H. A. Stone, Diffusiophoresis of a charged drop, *J. Fluid Mech.* **852**, 37–59 (2018).
10. Z. Zheng*, M. A. Fontelos*, **S. Shin** & H. A. Stone, Universality in the nonlinear leveling of capillary films, *Phys. Rev. Fluids (Rapid Commun.)* **9** 032001(R) (2018).
11. **S. Shin**, P. B. Warren & H. A. Stone, Cleaning by surfactant gradients: Particulate removal from porous materials and the significance of rinsing in fabric cleaning, *Phys. Rev. Appl.* **9** 034012 (2018). (*Featured in **Physics, Cosmos, Physics World, New Scientist.***)
12. N. A. Hynson, K. L. Frank, R. A. Alegado, A. S. Amend, M. Arif, G. M. Bennett, A. J. Jani, M. C. I. Medeiros, Y. Mileyko, C. E. Nelson, N. H. Nguyen, O. D. Nigro, S. Priscic, **S. Shin**, D. Takagi, S. T. Wilson & J. Y. Yew, Synergy among microbiota and their hosts: Leveraging the Hawaiian archipelago and local collaborative networks to address pressing questions in microbiome research, *mSystems* **3**, e00159-17 (2018).
13. Z. Zheng*, M. A. Fontelos*, **S. Shin**, M. C. Dallaston, D. Tseluiko, S. Kalliadasis & H. A. Stone, Healing capillary films, *J. Fluid Mech.* **838**, 404–434 (2018).
14. D. Lee, B. S. Kim, H. Moon, N. Lee, **S. Shin** & H. H. Cho, Enhanced boiling heat transfer on nanowire-forested surfaces under subcooling conditions, *Int. J. Heat Mass Transf.* **120** 1020–1030 (2018).
15. J. T. Ault, **S. Shin**, P. B. Warren & H. A. Stone, Diffusiophoresis in one-dimensional solute gradients, *Soft Matter* **13** 9015–9023 (2017).
16. **S. Shin**, J. T. Ault, P. B. Warren & H. A. Stone, Accumulation of colloidal particles in flow junctions induced by fluid flow and diffusiophoresis, *Phys. Rev. X* **7** 041038 (2017). (*Featured in **Phys.org.***)
17. F. Boulogne, **S. Shin**, J. Dervaux, L. Limat & H. A. Stone, Diffusiophoretic manipulation of particles in a drop deposited on a hydrogel, *Soft Matter* **13** 5122–5129 (2017).
18. **S. Shin**, J. T. Ault, J. Feng, P. B. Warren & H. A. Stone, Low-cost zeta potentiometry using diffusiophoresis, *Adv. Mater.* **29** 1701516 (2017).
19. **S. Shin***, O. Shardt*, P. B. Warren & H. A. Stone, Membraneless water filtration using CO₂, *Nature Commun.* **8** 15181 (2017). (*Highlighted in **Nature, Nature Reviews Chemistry. Featured in The Economist.***)
20. J. Lee, **S. Shin**, Y. Jiang, C. Jeong, H. A. Stone & C.-H. Choi, Oil-Impregnated nanoporous oxide layer for corrosion protection with self-healing, *Adv. Funct. Mater.* **27** 1606040 (2017). (*Selected as the front cover*)
21. **S. Shin**, E. Um, B. Sabass, J. T. Ault, M. Rahimi, P. B. Warren & H. A. Stone, Size-dependent control of colloid transport in dead-end channels via solute gradients, *Proc. Natl. Acad. Sci. U.S.A.* **113**, 257–261 (2016).
22. J. T. Ault, A. Fani, K. K. Chen, **S. Shin**, F. Gallaire & H. A. Stone, Vortex-breakdown induced particle capture in branching junctions, *Phys. Rev. Lett.* **117**, 084501 (2016).

23. J. Feng, J. K. Nunes, **S. Shin**, J. Yan, S. D. Stoyanov, L. N. Arnaudov, Y. L. Kong & H. A. Stone, A scalable platform for functional nanoemulsions via bubble bursting, *Adv. Mater.* **28**, 4047 (2016).
24. **S. Shin**, I. Jacobi & H. A. Stone, Bénard-Marangoni instability driven by moisture absorption, *EPL* **113**, 24002 (2016).
25. B. S. Kim, G. Choi, **S. Shin**, T. Gemming & H. H. Cho, Nano-inspired fluidic interactivity for boiling heat transfer: impact and criteria, *Sci. Rep.* **6**, 34348 (2016).
26. Z. Zheng, **S. Shin** & H. A. Stone, Converging gravity currents over a permeable substrate, *J. Fluid Mech.* **778**, 669–690 (2015).
27. **S. Shin**^{*}, J. T. Ault^{*} & H. A. Stone, Flow-driven rapid vesicle fusion via vortex trapping, *Langmuir* **31**, 7178–7182 (2015).
28. B. S. Kim, K. M. Yang, **S. Shin**, G. Choi & H. H. Cho, Local nucleation propagation on heat transfer uniformity during subcooled convective boiling, *Heat Mass Transf.* **51**, 1–9 (2015).
29. C.-S. Park, M.-H. Hong, **S. Shin**, H. H. Cho & H.-H. Park, Synthesis of mesoporous $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ thin films for thermoelectric materials, *J. Alloy Compd.* **632**, 246–250 (2015).
30. H. Moon, K. M. Kim, Y. H. Jeon, **S. Shin**, J. S. Park & H. H. Cho, Effect of thermal stress on creep lifetime for a gas turbine combustion liner, *Eng. Fail. Anal.* **47**, 34–40 (2015).
31. **S. Shin**^{*}, T. T. Al-Housseiny^{*}, B. S. Kim, H. H. Cho & H. A. Stone, The race of nanowires: morphological instabilities and a control strategy, *Nano Lett.* **14**, 4395–4399 (2014). (*Highlighted in Science – Editors’ Choice*)
32. G. Choi, B. S. Kim, H. Lee, **S. Shin** & H. H. Cho, Jet impingement in a crossflow configuration: Convective boiling and local heat transfer characteristics, *Int. J. Heat Fluid Flow* **50**, 378–385 (2014).
33. B. S. Kim, H. Lee, **S. Shin**, G. Choi & H. H. Cho, Interfacial wicking dynamics and its impact on critical heat flux of boiling heat transfer, *Appl. Phys. Lett.* **105**, 191601 (2014).
34. **S. Shin**^{*}, G. Choi^{*}, B. S. Kim & H. H. Cho, Flow boiling heat transfer on nanowire-coated surfaces with highly wetting liquid, *Energy* **76**, 428–435 (2014).
35. B. S. Kim, **S. Shin**, D. Lee, G. Choi, K. M. Kim & H. H. Cho, Stable and uniform heat dissipation by nucleate-catalytic nanowires for boiling heat transfer, *Int. J. Heat Mass Transf.* **70**, 23–32 (2014).
36. **S. Shin** & H. H. Cho, Self-formed platform for in situ measurement of electrical resistance of individual Cu nanowires, *Electrochim. Acta* **117**, 120–126 (2014).
37. H. Choi, J. H. Baek, T. H. Kim, J. Y. Song, **S. Shin**, H. H. Cho, D.-H. Ko, J. Kim, K. H. Jeong & M.-H. Cho, Effect of phonon scattering by atomically aligned Te layers in self-ordered Sb_2Te_2 films, *J. Mater. Chem. C* **1**, 7043–7053 (2013).
38. S. Cho, J. H. Kim, H. K. Cho, **S. Shin** & H. H. Cho, All-solution-processed $\text{InGaO}_3(\text{ZnO})_m$ thin films with layered structure, *J. Nanomater.* **2013**, 909786 (2013).

39. T.-J. Ha, **S. Shin**, H. K. Kim, M.-H. Hong, C.-S. Park, H. H. Cho, D. J. Choi & H.-H. Park, Use of ordered mesoporous SiO₂ as protection against thermal disturbance in phase-change memory, *Appl. Phys. Lett.* **102**, 144102 (2013).
40. M.-H. Hong, C.-S. Park, **S. Shin**, H. H. Cho, W.-S. Seo, Y. S. Lim, J.-K. Lee & H.-H. Park, Effect of surfactant concentration on the thermoelectric properties of mesoporous ZnO thin films, *J. Nanomater.* **2013**, 172504 (2013).
41. M.-H. Hong, S.-Y. Jung, T.-J. Ha, W.-S. Seo, Y. S. Lim, **S. Shin**, H. H. Cho & H.-H. Park, Thermoelectric properties of mesoporous TiO₂ thin films through annealing temperature and ratio of surfactant, *Surf. Coat. Technol.* **231**, 370–373 (2013).
42. J. Song, J. W. Lee, M. S. Yu, **S. Shin**, B. S. Kim & H. H. Cho, Thermal characteristics of inclined plate impinged by underexpanded sonic jet, *Int. J. Heat Mass Transf.* **62**, 223–229 (2013).
43. S.-Y. Jung, T.-J. Ha, C.-S. Park, W.-S. Seo, Y. S. Lim, **S. Shin**, H. H. Cho & H.-H. Park, Improvement in the conductivity ratio of ordered mesoporous Ag-TiO₂ thin films for thermoelectric materials, *Thin Solid Films* **529**, 94–97 (2013).
44. **S. Shin**, B. S. Kim, G. Choi, H. Lee & H. H. Cho, Double-templated electrodeposition: simple fabrication of micro-nano hybrid structure by electrodeposition for efficient boiling heat transfer, *Appl. Phys. Lett.* **101**, 251905 (2012).
45. T.-J. Ha, H. K. Kim, D. J. Choi, **S. Shin**, H. H. Cho, H. W. Jang, S.-J. Yoon & H. H. Park, Application of ordered mesoporous SiO₂ film for low power consumption in phase-change memory, *Microporous Mesoporous Mater.* **163**, 321–325 (2012).
46. J. H. Kim, D. K. Seo, C. H. Ahn, **S. Shin**, H. H. Cho & H. K. Cho, Hybrid solution processed InGaO₃(ZnO)_m thin films with periodic layered structures and thermoelectric properties, *J. Mater. Chem.* **22**, 16312–16317 (2012).
47. **S. Shin**, B. S. Kim, J. Song, H. Lee & H. H. Cho, A facile route to the fabrication of large-scale gate-all-around nanofluidic field-effect transistor with low leakage current, *Lab Chip* **12**, 2568–2574 (2012).
48. **S. Shin**, B. S. Kim, K. M. Kim & H. H. Cho, Multi-variable thermal design of T-structured phase-change memory cell using advanced response surface method, *Microelectron. Eng.* **91**, 1–8 (2012).
49. T.-J. Ha, H.-H. Park, H. W. Jang, S.-J. Yoon, **S. Shin** & H. H. Cho, Study on the thermal stability of ordered mesoporous SiO₂ film for thermal insulating film, *Microporous Mesoporous Mater.* **158**, 123–128 (2012).
50. **S. Shin**, B. S. Kim, K. M. Kim, B. H. Kong, H. K. Cho & H. H. Cho, Tuning the morphology of copper nanowires by controlling the growth processes in electrodeposition, *J. Mater. Chem.* **21**, 17967–17971 (2011).
51. K. M. Kim, **S. Shin**, D. H. Lee & H. H. Cho, Influence of material properties on temperature and thermal stress of thermal barrier coating near a normal cooling hole, *Int. J. Heat Mass Transf.* **54**, 5192–5199 (2011).
52. J. Lee, H. G. Kwon, **S. Shin**, S. Han, J. Ha, H. Yoo & H. H. Cho, Thermal design of hot plate for 300-mm wafer heating in post-exposure bake, *Microelectron. Eng.* **88**, 3195–3198 (2011).

53. D. K. Seo, **S. Shin**, H. H. Cho, B. H. Kong, D. M. Whang & H. K. Cho, Drastic improvement of oxide thermoelectric performance using thermal and plasma treatments of the InGaZnO thin films grown by sputtering, *Acta Mater.* **59**, 6743–6750 (2011).
54. T.-J. Ha, S.-Y. Jung, J.-H. Bae, H.-L. Lee, H. W. Jang, S.-J. Yoon, **S. Shin**, H. H. Cho & H.-H. Park, Analysis of heat transfer in ordered and disordered mesoporous TiO₂ films by finite element analysis, *Microporous Mesoporous Mater.* **144**, 191–194 (2011).
55. B. S. Kim, **S. Shin**, S. J. Shin, K. M. Kim & H. H. Cho, Control of superhydrophilicity/superhydrophobicity using silicon nanowires via electroless etching method and fluorine carbon coatings, *Langmuir* **27**, 10148–10156 (2011). (*Most Read Article*)
56. **S. Shin**, B. H. Kong, B. S. Kim, K. M. Kim, H. K. Cho & H. H. Cho, Over 95% of large-scale length uniformity in template-assisted electrodeposited nanowires by subzero-temperature electrodeposition, *Nanoscale Res. Lett.* **6**, 467 (2011). (*Highly Accessed Article*)
57. T.-J. Ha, Y.-J. Choi, S.-Y. Jung, W.-S. Seo, Y. S. Lim, **S. Shin**, H. H. Cho & H.-H. Park, Study on the electrical and thermal conductivity of ordered mesoporous TiO₂ thin film incorporated with Pt nanoparticles, *Jpn. J. Appl. Phys.* **50**, 075001 (2011).
58. S.-Y. Jung, T.-J. Ha, W.-S. Seo, Y. S. Lim, **S. Shin**, H. H. Cho & H.-H. Park, Thermoelectric properties of Nb-doped ordered mesoporous TiO₂, *J. Electron. Mater.* **40**, 652–656 (2011).
59. B. S. Kim, **S. Shin**, S. J. Shin, K. M. Kim & H. H. Cho, Micro-nano hybrid structures with manipulated wettability using a two-step silicon etching on a large area, *Nanoscale Res. Lett.* **6**, 333 (2011).
60. **S. Shin**, K. M. Kim, J. Song, H. K. Kim, D. J. Choi & H. H. Cho, Thermal stress analysis of Ge₁Sb₄Te₇-based phase-change memory devices, *IEEE Trans. Electron. Dev.* **58**, 782–791 (2011).
61. B. S. Kim, B. S. Kwak, **S. Shin**, S. Lee, K. M. Kim, H.-I. Jung & H. H. Cho, Optimization of microscale vortex generators in a microchannel using advanced response surface method, *Int. J. Heat Mass Transf.* **54**, 118–125 (2011).
62. T.-J. Ha, H.-H. Park, E. S. Kang, **S. Shin** & H. H. Cho, Variations in mechanical and thermal properties of mesoporous alumina thin films due to porosity and ordered pore structure, *J. Colloid Interface Sci.* **345**, 120–124 (2010).
63. **S. Shin**, H. K. Kim, J. Song, D. J. Choi & H. H. Cho, Phase-dependent thermal conductivity of Ge₁Sb₄Te₇ and N:Ge₁Sb₄Te₇ for phase change memory applications, *J. Appl. Phys.* **107**, 033518 (2010).
64. H. K. Kim, S. Y. Lee, D. J. Choi, **S. Shin**, H. H. Cho & J. S. Roh, Effects of nitrogen doping and working pressure on the crystallization of Ge₁Sb₄Te₇ thin films for PRAM applications, *J. Kor. Phys. Soc.* **55**, 1896–1900 (2009).
65. D. H. Lee, K. M. Kim, **S. Shin** & H. H. Cho, Thermal analysis in a film cooling hole with thermal barrier coating, *J. Thermophys. Heat Transf.* **23**, 843–846 (2009).
66. K. M. Kim, H. Lee, B. S. Kim, **S. Shin**, D. H. Lee & H. H. Cho, Optimal design of angled rib turbulators in a cooling channel, *Heat Mass Transf.* **45**, 1617–1625 (2009).

67. **S. Shin**, T.-J. Ha, H.-H. Park & H. H. Cho, Thermal conductivity of BCC-ordered mesoporous silica films, *J. Phys. D: Appl. Phys.* **42**, 125404 (2009).
68. S. G. Choi, T.-J. Ha, H.-H. Park, **S. Shin** & H. H. Cho, Effective heat conservation in a sandwich-structured microbolometer using mesoporous TiO₂ layers, *Sens. Actuators A* **155**, 131–135 (2009).
69. **S. Shin**, H. N. Cho, B. S. Kim & H. H. Cho, Influence of upper layer on measuring thermal conductivity of multilayer thin films using differential 3- ω method, *Thin Solid Films* **517**, 933–936 (2008).
70. S. G. Choi, T.-J. Ha, B.-G. Yu, **S. Shin**, H. H. Cho & H.-H. Park, Application of mesoporous TiO₂ as a thermal isolation layer for infrared sensors, *Thin Solid Films* **516**, 212–215 (2007).

BOOKS AND BOOK
CHAPTERS

1. **S. Shin** & A. S. Kim, (2018), Temperature Effect on Forward Osmosis, in H. Du, A. Thompson & X. Wang (Eds.), *Osmotically Driven Membrane Process – Approach, Development and Current Status*, InTech. (ISBN 978-953-51-5688-8)

INVENTION
DISCLOSURES AND
PATENTS

1. *Targeted delivery and release of drugs in tumors using sequential solution exchange*, Invention disclosure at the University of Hawaii at Manoa (2018).
2. *Methods of particle manipulation and analysis*, U.S. Provisional Patent Application No. 62/682,449 with J. T. Ault & H. A. Stone (2018).
3. *Gradient induced particle motion in suspensions*, U.S. Provisional Patent Application No. 15/913,649 with H. A. Stone, P. B. Warren, O. Shardt & S. Shim (2018).
4. *Rapid preconcentrator using flow-driven diffusiophoretic accumulation*, Invention disclosure at Princeton University with H. A. Stone, J. T. Ault & P. B. Warren (2017).
5. *Zeta potentiometer using diffusiophoresis and diffusioosmosis*, Invention disclosure at Princeton University with H. A. Stone, J. T. Ault, J. Feng & P. B. Warren (2017).
6. *Device and methods for continuous flow separation of particles by gas dissolution*, Invention disclosure at Princeton University with H. A. Stone, P. B. Warren & O. Shardt (2016).
7. *Particle motion in suspensions driven by contact with gas*, Invention disclosure at Princeton University with H. A. Stone, P. B. Warren, O. Shardt & S. Shim (2016).
8. *A method for producing large lipid vesicles*, Invention disclosure at Princeton University with H. A. Stone & J. T. Ault (2015).
9. *A method for controlling growth instability in template-assisted electrodeposition of nanowires*, Invention disclosure at Princeton University with H. A. Stone, T. T. Al-Housseiny, H. H. Cho & B. S. Kim (2014).
10. *Highly efficient desalination system and method using multi-stage ionic field-effect transistor*, Korean Patent 10-1592892 with H. H. Cho & B. S. Kim (2016).
11. *Highly efficient nanofluidic energy harvesting system and method using ionic field-effect transistor*, Korean Patent 10-1419742 with H. H. Cho & B. S. Kim (2014).
12. *Light-heat energy conversion module having nanostructured surface and method for fabricating the same*, Korean Patent 10-1374272 with H. H. Cho, B. S. Kim, J. Song & T. H. Kim (2014).

13. *Heat transfer element*, Korean Patent 10-1273365 with H. H. Cho, B. S. Kim, S. H. Lee & J. Song (2013).
14. *Method for Manufacturing Structure and Structure for Removing Bubble*, Korean Patent 10-1163639 with H. H. Cho, K. M. Kim, B. S. Kim, S. H. Lee & J. Song (2012).
15. *Bipolar plate with nano and micro structures*, Korean Patent 10-1075518 with H. H. Cho, J. H. Yoon, H. G. Kwon, B. S. Kim & S. H. Lee (2011).
16. *PCR device which has a real-time monitoring function*, Korean Patent 10-1040489 with H. H. Cho, K. M. Kim, D. H. Lee, B. S. Kim, S. H. Lee & M. O. Lee (2011).
17. *Apparatus of PCR using constant temperature metal block and method thereof*, Korean Patent 10-0790004 with H. H. Cho, M. S. Yu, D. H. Lee, J. J. Yi & B. S. Kim (2007).

FUNDED GRANTS

1. National Science Foundation, CBET #1930691 (\$320,238), Role: PI, 2019-2022. *Colloid dynamics in porous media induced by fluid flow and solute transport.*
2. National Science Foundation, CMMI #1919539 (\$466,902), Role: Co-PI (PI: Joseph J. Brown, Co-PIs: Tyler Ray, Sangwoo Shin, Woochul Lee, Aaron Ohta), 2019-2022. *MRI: Acquisition of High-Speed Lithography Tool for Research and Education at the University of Hawaii.*
3. National Research Foundation of Korea, #2013R1A6A3A03020179 (\$30,000), Role: PI, 2013-2014. *Development of highly-efficient electrokinetic energy harvesting through surface engineering.*

AWARDS

| | |
|---|------|
| Finalist, Falling Walls Lab 2017 (Falling Walls Foundation) | 2017 |
| National Postdoctoral Fellowship (National Research Foundation) | 2013 |
| Distinguished Thesis Award (Yonsei University) | 2012 |
| Best Thesis Award (Energy & Power Engineering Division, KSME) | 2012 |
| Outstanding Poster Award (Micro & Nano Engineering Division, KSME) | 2012 |
| Outstanding Paper Award (Dept. of Mech. Eng., Yonsei University) | 2012 |
| Nano Today 2011 Student Travel Award (2nd Nano Today Conference) | 2011 |
| Outstanding Paper Award (Dept. of Mech. Eng., Yonsei University) | 2011 |
| National Science and Technology Fellowship (National Research Foundation) | 2008 |
| Seoul Science Fellowship (Seoul Metropolitan Government) | 2007 |

INVITED TALKS

| | |
|--|-----------|
| SPIE DCS 2020, Anaheim, CA | Apr. 2020 |
| Mini-symposium on Fluid-Structure Interactions, OIST | Jan. 2020 |
| Yonsei University, Mechanical Engineering | Jan. 2020 |
| Chungnam National University, Chemical Engineering | Jan. 2020 |
| UNIST Mechanical Engineering | Dec. 2019 |
| TMS 2019, San Antonio, TX | Mar. 2019 |
| IEEE NANOMED 2018, Honolulu, HI | Dec. 2018 |
| Incheon National University, Materials Science and Engineering | Nov. 2018 |
| Korea Institute of Energy Research | Nov. 2018 |
| Chung-Ang University, Mechanical Engineering | Nov. 2018 |
| Okinawa Institute of Science and Technology (OIST) | Nov. 2018 |
| Falling Walls Lab 2017, Berlin, Germany | Nov. 2017 |
| Korea Institute of Science and Technology (KIST) | Jan. 2017 |
| Yonsei University, Mechanical Engineering | Jan. 2017 |

| | |
|---|-----------|
| Sungkyunkwan University, Mechanical Engineering | Jan. 2017 |
| UNIST Physics & IBS CSLM | Feb. 2016 |
| Yonsei University, Mechanical Engineering | Jan. 2016 |
| Stevens Institute of Technology, Mechanical Engineering | Mar. 2015 |
| New Jersey Institute of Technology, Mathematical Sciences | Apr. 2014 |

TEACHING
EXPERIENCE

| | |
|--|------------------------------|
| Course Instructor | |
| Thermodynamics (ME311; Undergraduate) | F. 2019 |
| Mechanics of Fluids and Lab (ME322; Undergraduate) | Sp. F. 2017, F. 2018 |
| Introduction to Transport Phenomena (ME491; Undergraduate) | Sp. 2020 |
| Microfluidics and Nanofluidics (ME624; Graduate) | Sp. 2018, Sp. 2019, Sp. 2020 |

OTHER
PROFESSIONAL
ACTIVITIES

| | |
|------------------------------|--------------|
| Co-founder | |
| Phoresis Inc., Princeton, NJ | 2018–current |

| | |
|---|-----------|
| Conference Organizing Committee | |
| Technical Program Committee, <i>13th IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED 2019)</i> | Nov. 2019 |
| Technical Program Committee, <i>12th IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE-NANOMED 2018)</i> | Dec. 2018 |

Journal Reviewer

Served as a reviewer for: *ACS Nano*, *Applied Physics A*, *Applied Physics Letters*, *Applied Materials Today*, *Applied Thermal Engineering*, *Biomedical Physics & Engineering Express*, *Biomicrofluidics*, *Energy*, *Entropy*, *Experimental Thermal and Fluid Sciences*, *Heat and Mass Transfer*, *IEEE Transactions on Electron Devices*, *International Journal of Heat and Mass Transfer*, *International Journal of Thermal Sciences*, *Journal of Cleaner Production*, *Journal of Fluid Mechanics*, *Journal of Heat Transfer*, *Physica Scripta*, *Physical Review E*, *Physical Review Letters*, *Physical Review X*, *Physics of Fluids*, *Research*, *Science*, *Science Advances*, *Scientific Reports*, *Soft Matter*.

Memberships

American Physical Society, Materials Research Society, American Chemical Society