

# Sangwoo Shin

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CURRENT POSITION	<b>University of Hawaii at Manoa</b> , Honolulu, HI <b>Assistant Professor</b> , Department of Mechanical Engineering	
EDUCATION	<b>Yonsei University</b> , Seoul, Korea  Ph.D., Mechanical Engineering, 2012 <ul style="list-style-type: none"><li>• Heat/mass transfer, Energy management, Nanomaterials, Nanofluidics</li><li>• Thesis: <i>Thermal Management of Energy Devices using Nanostructured Materials</i></li><li>• Advisor: Hyung Hee Cho</li></ul> B.S., Mechanical Engineering, 2005	
PROFESSIONAL EXPERIENCE	<b>Co-founder</b> Phoresis Inc., Princeton, NJ	2018–current
	<b>Assistant Professor</b> Department of Mechanical Engineering, University of Hawaii at Manoa	2017–current
	<b>Postdoctoral Research Associate</b> Department of Mechanical and Aerospace Engineering, Princeton University	2013–2016
	<b>Postdoctoral Research Associate</b> Low Observable Research Center, Yonsei University	2012–2013
REFEREED JOURNAL PUBLICATIONS	<b>Google Scholar profile:</b> <a href="https://scholar.google.com/citations?user=ZNZtyqcAAAAJ">https://scholar.google.com/citations?user=ZNZtyqcAAAAJ</a> <ol style="list-style-type: none"><li>1. J. T. Ault, <b>S. Shin</b> &amp; H. A. Stone, Diffusiophoresis of colloidal particles in narrow channel flows, <i>J. Fluid Mech.</i>, <b>854</b>, 420–448 (2018).</li><li>2. <b>S. Shin</b><sup>*</sup>, G. Choi<sup>*</sup>, B. Rallabandi, D. Lee, D. I. Shim, B. S. Kim, K. M. Kim &amp; H. H. Cho, Enhanced boiling heat transfer using self-actuated nano-bimorphs, <i>Nano Lett.</i> in press (doi:10.1021/acs.nanolett.8b02747). (*equal contribution)</li><li>3. F. Yang, <b>S. Shin</b> &amp; H. A. Stone, Diffusiophoresis of a charged drop, <i>J. Fluid Mech.</i> <b>852</b>, 37–59 (2018).</li><li>4. Z. Zheng<sup>*</sup>, M. A. Fontelos<sup>*</sup>, <b>S. Shin</b> &amp; H. A. Stone, Universality in the nonlinear leveling of capillary films, <i>Phys. Rev. Fluids (Rapid Commun.)</i> <b>9</b> 032001(R) (2018). (*equal contribution)</li><li>5. <b>S. Shin</b>, P. B. Warren &amp; H. A. Stone, Cleaning by surfactant gradients: Particulate removal from porous materials and the significance of rinsing in fabric cleaning, <i>Phys. Rev. Appl.</i> <b>9</b> 034012 (2018). (<i>Featured in <b>Physics</b>, <b>Cosmos</b>, <b>Physics World</b>, <b>New Scientist</b>.</i>)</li></ol>	

6. 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).
7. 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). (\*equal contribution)
8. 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).
9. J. T. Ault, **S. Shin**, P. B. Warren & H. A. Stone, Diffusiophoresis in one-dimensional solute gradients, *Soft Matter* **13** 9015–9023 (2017).
10. **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***)
11. 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).
12. **S. Shin**, J. T. Ault, J. Feng, P. B. Warren & H. A. Stone, Low-cost zeta potentiometry using diffusiophoresis, *Adv. Mater.* **29** 1701516 (2017).
13. **S. Shin**\*, O. Shardt\*, P. B. Warren & H. A. Stone, Membraneless water filtration using CO<sub>2</sub>, *Nature Commun.* **8** 15181 (2017). (\*equal contribution) (*Highlighted in Nature, Nature Reviews Chemistry. Featured in The Economist.*)
14. 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*)
15. **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).
16. 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).
17. 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).
18. **S. Shin**, I. Jacobi & H. A. Stone, Bénard-Marangoni instability driven by moisture absorption, *EPL* **113**, 24002 (2016).
19. 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).
20. Z. Zheng, **S. Shin** & H. A. Stone, Converging gravity currents over a permeable substrate, *J. Fluid Mech.* **778**, 669–690 (2015).

21. **S. Shin\***, J. T. Ault\* & H. A. Stone, Flow-driven rapid vesicle fusion via vortex trapping, *Langmuir* **31**, 7178–7182 (2015). (\*equal contribution)
22. 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).
23. 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).
24. 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).
25. **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). (\*equal contribution) (*Highlighted in Science – Editors’ Choice*)
26. 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).
27. 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).
28. **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). (\*equal contribution)
29. 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).
30. **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).
31. H. Choi, J. H. Baeck, 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  $\text{Sb}_2\text{Te}_2$  films, *J. Mater. Chem. C* **1**, 7043–7053 (2013).
32. 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).
33. 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  $\text{SiO}_2$  as protection against thermal disturbance in phase-change memory, *Appl. Phys. Lett.* **102**, 144102 (2013).
34. 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).
35. 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  $\text{TiO}_2$  thin films through annealing temperature and ratio of surfactant, *Surf. Coat. Technol.* **231**, 370–373 (2013).

36. 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).
37. 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-TiO<sub>2</sub> thin films for thermoelectric materials, *Thin Solid Films* **529**, 94–97 (2013).
38. **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).
39. 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 SiO<sub>2</sub> film for low power consumption in phase-change memory, *Microporous Mesoporous Mater.* **163**, 321–325 (2012).
40. J. H. Kim, D. K. Seo, C. H. Ahn, **S. Shin**, H. H. Cho & H. K. Cho, Hybrid solution processed InGaO<sub>3</sub>(ZnO)<sub>m</sub> thin films with periodic layered structures and thermoelectric properties, *J. Mater. Chem.* **22**, 16312–16317 (2012).
41. **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).
42. **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).
43. 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 SiO<sub>2</sub> film for thermal insulating film, *Microporous Mesoporous Mater.* **158**, 123–128 (2012).
44. **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).
45. 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).
46. 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).
47. 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).
48. 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 TiO<sub>2</sub> films by finite element analysis, *Microporous Mesoporous Mater.* **144**, 191–194 (2011).
49. 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*)

50. **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*)
51. 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 TiO<sub>2</sub> thin film incorporated with Pt nanoparticles, *Jpn. J. Appl. Phys.* **50**, 075001 (2011).
52. 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 TiO<sub>2</sub>, *J. Electron. Mater.* **40**, 652–656 (2011).
53. 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).
54. **S. Shin**, K. M. Kim, J. Song, H. K. Kim, D. J. Choi & H. H. Cho, Thermal stress analysis of Ge<sub>1</sub>Sb<sub>4</sub>Te<sub>7</sub>-based phase-change memory devices, *IEEE Trans. Electron Dev.* **58**, 782–791 (2011).
55. 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).
56. 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).
57. **S. Shin**, H. K. Kim, J. Song, D. J. Choi & H. H. Cho, Phase-dependent thermal conductivity of Ge<sub>1</sub>Sb<sub>4</sub>Te<sub>7</sub> and N:Ge<sub>1</sub>Sb<sub>4</sub>Te<sub>7</sub> for phase change memory applications, *J. Appl. Phys.* **107**, 033518 (2010).
58. 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 Ge<sub>1</sub>Sb<sub>4</sub>Te<sub>7</sub> thin films for PRAM applications, *J. Kor. Phys. Soc.* **55**, 1896–1900 (2009).
59. 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).
60. 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).
61. **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).
62. S. G. Choi, T.-J. Ha, H.-H. Park, **S. Shin** & H. H. Cho, Effective heat conservation in a sandwich-structured microbolometer using mesoporous TiO<sub>2</sub> layers, *Sens. Actuators A* **155**, 131–135 (2009).
63. **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- $\omega$  method, *Thin Solid Films* **517**, 933–936 (2008).
64. S. G. Choi, T.-J. Ha, B.-G. Yu, **S. Shin**, H. H. Cho & H.-H. Park, Application of mesoporous TiO<sub>2</sub> 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. *Methods of particle manipulation and analysis*, U.S. Provisional Patent Application No. 62/682,449 with J. T. Ault & H. A. Stone (2018).
2. *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).
3. *Rapid preconcentrator using flow-driven diffusiophoretic accumulation*, Invention disclosure at Princeton University with H. A. Stone, J. T. Ault & P. B. Warren (2017).
4. *Zeta potentiometer using diffusiophoresis and diffusioosmosis*, Invention disclosure at Princeton University with H. A. Stone, J. T. Ault, J. Feng & P. B. Warren (2017).
5. *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).
6. *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).
7. *A method for producing large lipid vesicles*, Invention disclosure at Princeton University with H. A. Stone & J. T. Ault (2015).
8. *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).
9. *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).
10. *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).
11. *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).
12. *Heat transfer element*, Korean Patent 10-1273365 with H. H. Cho, B. S. Kim, S. H. Lee & J. Song (2013).
13. *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).
14. *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).
15. *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).
16. *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).

RESEARCH GRANTS	1. <i>Development of highly-efficient electrokinetic energy harvesting through surface engineering</i> , PI, \$30,000, National Research Foundation of Korea, 2013-2014.	
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	TMS 2019, San Antonio, TX	Mar. 2019
	IEEE NANOMED 2018, Honolulu, HI	Dec. 2018
	Okinawa Institute of Science and Technology (OIST)	Nov. 2018
	University of Hawaii at Manoa, College of Engineering	Apr. 2017
	University of Hawaii at Manoa, Civil and Environmental Engineering	Feb. 2017
	Korea Institute of Science and Technology (KIST)	Jan. 2017
	Yonsei University, Mechanical Engineering	Jan. 2017
	Sungkyunkwan University, Mechanical Engineering	Jan. 2017
	University of Hawaii at Manoa, Mechanical Engineering	May 2016
	Gwangju Institute of Science and Technology, Mechanical Engineering	Mar. 2016
	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	
	Mechanics of Fluids and Lab (ME322; Undergraduate)	Spring & Fall, 2017 Fall, 2018
	Microfluidics and Nanofluidics (ME696; Graduate)	Spring, 2018
	Teaching Assistant	
	Patent and Informational Analysis (ENG6070; Graduate)	Spring, 2007
	Energy and Power Engineering (MEU4600; Undergraduate)	Spring, 2006
	Heat Transfer (MEU3650; Undergraduate)	Fall, 2005
	Creative Mechanical Engineering Design (MEU2300; Undergraduate)	Spring, 2005
SERVICE	Conference Organizing Committee	
	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 <i>ACS Nano, Applied Physics A, Applied Physics Letters, Biomedical Physics &amp; Engineering Express, 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 Heat Transfer, Physica Scripta, Physics of Fluids, Scientific Reports, Sensors.</i>	

## Memberships

American Physical Society, Materials Research Society, American Chemical Society