

Jong Eun Ryu
 Assistant Professor
 Department of Mechanical and Aerospace Engineering
 North Carolina State University
 PI of [Composites Manufacturing Lab @ NCSU](#)

EDUCATION:

POSTDOCTORAL

University of California, LA	Nanomanufacturing Bio-nanotechnology	2009-2011
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GRADUATE

University of California, LA	Ph.D. Mechanical Engineering	2009
(Advisor: Prof. Thomas Hahn, Dissertation " <i>Nanomanufacturing Processes for Biofuel Cells and Sensors</i> ")		

KAIST, Korea	M.S. Mechanical Engineering	2006
(Advisor: Prof. Soon Bok Lee, Thesis " <i>The influence of reflow profile on the thermal fatigue behaviors of BGA solder joint</i> ")		

UNDERGRADUATE

KAIST, Korea	B.S. Mechanical Engineering	2004
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APPOINTMENTS:

ACADEMIC

North Carolina State University	Assistant Professor	2018 – Present
Indiana University-Purdue University Indianapolis	Assistant Professor	2013 – 2018

NON-ACADEMIC

Intel Corp. Logic Technology Development	Senior TD Engineer	2011 - 2013
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PROFESSIONAL HONORS AND AWARDS:

<u>Award Name</u>	<u>Granted By</u>	<u>Date Awarded</u>
Summer Faculty Fellowship	AFOSR	2019
Summer Faculty Fellowship	AFOSR	2018
International Travel Grant	Purdue Research Foundation	2017
Summer Faculty Research Grant	Purdue Research Foundation	2017
Summer Faculty Fellowship	AFOSR	2016
Summer Faculty Fellowship	AFOSR	2015
Travel Grant to the ANTEC conference	Society of Plastics Engineers	2009
PerkinElmer Best Abstract (ANTEC)	Society of Plastics Engineers	2009
Korean Honor Scholarship	The Embassy of Korea	2008
Academic Scholarship	KAIST	2004 - 2006
Academic Excellence Scholarship	KAIST	1999 - 2004

RESEACH INTEREST: Metamaterials; Scalable Nanomanufacturing; Additive manufacturing; Multifunctional and Multiphysics Composites

TEACHING EXPERIENCE: Basic Mechanics; Mechanics of Materials; Dynamics of Machines, Introduction to Nanotechnology; Flexible Electronics

PROFESSIONAL ORGANIZATION MEMBERSHIPS:

<u>Organization</u>	<u>Inclusive Dates</u>
American Society of Mechanical Engineers	2013 – present
Institute of Electrical and Electronics Engineers	2013 – present
Materials Research Society	2010 – present
Korean-American Scientists and Engineers Association	2009 – present

PROFESSIONAL SERVICE:

<u>Organization</u>	<u>Activity</u>	<u>Inclusive Dates</u>
Advanced Composites and Hybrid Materials	Editorial Board	2017-present
Engineered Science	Editorial Board	2017-present

Engineered Science Materials and Man.	Editorial Board	2017-present
Biosensors and Bioelectronics	Manuscript reviewer	2010-present
Sensors & Actuators: B. Chemical	Manuscript reviewer	2010-present
Materials Science and Engineering B	Manuscript reviewer	2010-present
Journal of Electronic Materials	Manuscript reviewer	2011-present
Electrochimica Acta	Manuscript reviewer	2011-present
Journal of The Electrochemical Society	Manuscript reviewer	2013-present
Journal of Composites Materials	Manuscript reviewer	2013-present
ECS Journal of Solid State Science and Technology	Manuscript reviewer	2013-present
Optics Letters	Manuscript reviewer	2015-present
Journal of Materials Processing Technology	Manuscript reviewer	2015-present
Journal of Nanoscience and Nanotechnology	Manuscript reviewer	2016-present
RSC Advances	Manuscript reviewer	2016-present
Science of Advanced Materials	Manuscript reviewer	2017-present
ASME IDETC Conference	Manuscript reviewer	2017-present
PLOS One	Manuscript reviewer	2017-present
Ionics	Manuscript reviewer	2018-present
ASME Journal of Heat Transfer	Manuscript reviewer	2019-present
Materials Chemistry and Physics	Manuscript reviewer	2019-present
Chemical Engineering Science	Manuscript reviewer	2019-present
Additive Manufacturing	Manuscript reviewer	2019-present

PUBLICATIONS:

Refereed Journal Papers

1. Wang, Y., Liu, Y., Wang, C., Liu, H., Zhang, J., Lin, J., Fan, J., Ding, T., Ryu*, J.E., Guo, Z., "Significantly Enhanced Ultrathin NiCo-based MOF Nanosheet Electrodes Hybridized with Ti₃C₂T_x MXene for High Performance Asymmetric Supercapacitors" (Under Review)
2. Meng, L., Ryu, J.* et al. "A Combined Modeling and Experimental Study of Tensile Properties of Additively Manufactured Polymeric Composite Materials" (Under Review)
3. Chen, J., Zhu, Y., Huang, J., Zhou, J., Pan, D., Wu, S., Ding, T., Umar, A., Ryu, J.E., Guo, Z., "Advances in Responsively Conductive Polymer Nanocomposites and Sensing Application," (Under Review)
4. Mosey, A., Yue, L., Gaire, B., Ryu, J.E. and Cheng, R., 2020. Controlled short time large scale synthesis of magnetic cobalt nanoparticles on carbon nanotubes by flash annealing. *Journal of Applied Physics*, 127(4), p.043902.
5. Seok, I, Al-Hossain, A., Waliullah, M., Ryu, J.E., Fabrication of Nano-Patterned Arrays Using Pulsed Light Technique, *Engineered Science*, 7, 59-64, 2019
6. Islam, MD, Al Yassi, H., Dong, M, Choi, DS, Seok, I, Liu, C, Guo, Z, Ryu, JE, 2019. Hierarchical assembly of CuO nano-dandelions on 3-D printed template, *Engineered Science*, 6, pp. 86-89, 2019
7. Berndt, A.J., Hwang, J., Islam, M.D., Sihm, A., Urbas, A.M., Ku, Z., Lee, S.J., Czaplewski, D.A., Dong, M., Shao, Q., Wu, S., Guo, Z., and Ryu*, J.E., 2019. Poly (sulfur-random-(1, 3-diisopropenyl)benzene)) based mid-wavelength infrared polarizer: Optical property experimental and theoretical analysis. *Polymer*, 176, pp.118-126.
8. Kanagaraj, A.B., Chaturvedi, P., Al Yassi, H., Orabi, L., Ryu, J.E., Park, J.R. and Choi, D.S., 2019. Electrochemically Grown Vertical CdTe Nanowire Arrays on a Flexible/Transparent Substrate. *Materials Letters*, 253, pp. 113-116
9. An, B.H., Park, B.C., Yassi, H.A., Lee, J.S., Park, J.R., Kim, Y.K., Ryu, J.E. and Choi, D.S., 2019. Fabrication of graphene-magnetite multi-granule nanocluster composites for microwave absorption application. *Journal of Composite Materials*, p.0021998319853032.
10. Ryu*, J.E., Salcedo, E., Lee, H.J., Jang, S.J., Jang, E.Y., Yassi, H.A., Baek, D., Choi, D. and Lee, E., 2019. Material models and finite analysis of additively printed polymer composites. *Journal of Composite Materials*, 53(3), pp.361-371.
11. Hwang, J., Oh, B., Kim, Y., Silva, S., Kim, J.O., Czaplewski, D.A., Ryu, J.E., Kim, E.K., Urbas, A., Zhou, J. and Ku, Z., 2018. Fabry-Perot cavity resonance enabling highly polarization-sensitive double-layer gold grating. *Scientific reports*, 8(1), p.14787.
12. An, B.H., Park, B.C., Kanagaraj, A.B., Chaturvedi, P., Al Yassi, H., Park, J.R., Kim, Y.G., Ryu, J.E., Sanduleanu, M. and Choi, D.S., 2018. Microwave absorption properties of magnetite multi-granule nanocluster-multiwall carbon nanotube composites. *Functional Materials Letters*, 12(2), pp. 1950011
13. Mansouri, M.S., An, B.H., Al Shibli, H., Al Yassi, H., Alkindi, T.S., Lee, J.S., Kim, Y.K., Ryu, J.E. and Choi, D.S., 2018. Fabrication of three-dimensional electrical patterns by swollen-off process: An evolution of the lift-off

process. *Current Applied Physics*, 18(11), pp.1235-1239.

14. Salcedo, E., Baek, D., Berndt, A. and Ryu*, J.E., 2018. Simulation and validation of three dimension functionally graded materials by material jetting. *Additive Manufacturing*, 22, pp.351-359.

(Above are the publication at NCSU)

15. Pan, Y., Schubert, D.W., Ryu, J.E., Wujick, E., Liu, C., Shen, C. and Liu, X., 2018. Dynamic oscillatory rheological properties of polystyrene/poly (methyl methacrylate) blends and their composites in the presence of carbon black. *Eng. Sci.*, 1, pp.86-94.
16. Zhao, J., Wu, L., Zhang, C., Li, T., Jiang, Q., Wang, F., Zhao, P., Ryu, J.E. and Guo, Z., 2018. Ionic liquid-assisted synthesis of Yb³⁺-Tm³⁺ codoped Y7O6F9 petal shaped microcrystals with enhanced upconversion emission. *Materials Research Bulletin*, 103, pp.19-24.
17. Choi, D., Yang, E.H., Gill, W., Berndt, A., Park, J.R. and Ryu, J.E., 2018. Fabrication and electrochemical characterization of super-capacitor based on three-dimensional composite structure of graphene and a vertical array of carbon nanotubes. *Journal of Composite Materials*, 52(22), pp.3039-3044.
18. Zhao, M., Meng, L., Ma, L., Ma, L., Yang, X., Huang, Y., Ryu, J.E., Shankar, A., Li, T., Yan, C. and Guo, Z., 2018. Layer-by-layer grafting CNTs onto carbon fibers surface for enhancing the interfacial properties of epoxy resin composites. *Composites Science and Technology*, 154, pp.28-36.
19. Shankar, A., Salcedo, E., Berndt, A., Choi, D. and Ryu*, J.E., 2018. Pulsed light sintering of silver nanoparticles for large deformation of printed stretchable electronics. *Advanced Composites and Hybrid Materials*, 1(1), pp.193-198.
20. Park, J.R., Berndt, A., Kim, Y.K., Lee, J.S., Ryu*, J.E., and Choi, D.S., 2018. Formation of high aspect ratio fused silica nanowalls by fluorine-based deep reactive ion etching. *Nano-Structures & Nano-Objects*, 15, pp.212-215.
21. Cheng, C., Fan, R., Wang, Z., Shao, Q., Guo, X., Xie, P., Yin, Y., Zhang, Y., An, L., Lei, Y. and Ryu, J.E., 2017. Tunable and weakly negative permittivity in carbon/silicon nitride composites with different carbonizing temperatures. *Carbon*, 125, pp.103-112.
22. Sun, K., Xie, P., Wang, Z., Su, T., Shao, Q., Ryu, J., Zhang, X., Guo, J., Shankar, A., Li, J. and Fan, R., 2017. Flexible polydimethylsiloxane/multi-walled carbon nanotubes membranous metacomposites with negative permittivity. *Polymer*, 125, pp.50-57.
23. Chen, A., Wang, L., Li, B.Y., Sherman, J., Ryu, J.E., Hamamura, K., Liu, Y., Nakshatri, H. and Yokota, H., 2017. Reduction in migratory phenotype in a metastasized breast cancer cell line via downregulation of S100A4 and GRM3. *Scientific reports*, 7(1), p.3459.
24. Cao, Y., Huang, J., Peng, X., Cao, D., Galaska, A., Qiu, S., Liu, J., Khan, M.A., Young, D.P., Ryu, J.E. and Feng, H., 2017. Poly (vinylidene fluoride) derived fluorine-doped magnetic carbon nanoadsorbents for enhanced chromium removal. *Carbon*, 115, pp.503-514.
25. TruongVo, T.N., Kennedy, R.M., Chen, H., Chen, A., Berndt, A., Agarwal, M., Zhu, L., Nakshatri, H., Wallace, J., Na, S., Yokota, H., and Ryu*, J.E., 2017. Microfluidic channel for characterizing normal and breast cancer cells. *Journal of Micromechanics and Microengineering*, 27(3), p.035017.
26. Mosey, A., Gaire, B., Kim, J., Ryu, J.E. and Cheng, R., 2017. Tunable cobalt nanoparticle synthesis by intense pulse flash annealing. *AIP Advances*, 7(5), p.056308.
27. Espich, T., Salcedo, E., Kulkarni, A., Sung Choi, D. and Ryu*, J.E., 2017. Scalable nanoparticle assembly on carbon nanotubes using flash-induced dewetting. *Journal of Composite Materials*, 51(9), pp.1299-1305.
28. Kim, J., Shankar, A., Zhu, J., Choi, D.S., Guo, Z. and Ryu*, J.E., 2017. Reinforcement of Cu nanoink sintered film with extended carbon nanofibers for large deformation of printed electronics. *Journal of Composite Materials*, 51(7), pp.997-1003.
29. Choi, D., An, B.H., Mansouri, M., Ali, D., Khalil, M., Xu, K., Nwoke, D., Park, J.R., Shankar, A. and Ryu, J.E., 2017. Micro-capacitor with vertically grown silver nanowires and bismuth ferric oxide composite structures on silicon substrates. *Journal of Composite Materials*, 51(7), pp.965-969.
30. Hopkins, X., Gill, W.A., Kringel, R., Wang, G., Hass, J., Acharya, S., Park, J., Jeon, I.T., An, B.H., Lee, J.S. and Ryu, J.E., 2016. Radio frequency-mediated local thermotherapy for destruction of pancreatic tumors using Ni–Au core–shell nanowires. *Nanotechnology*, 28(3), p.03LT01.
31. Gill, W.A., Ali, D., Choi, D.S., Park, J.R., Ryu, J.E., and Kim, Y.K., 2016. 3 Dimensional-Printed Micro-Container with Graphene Current Collector and Manganese Oxide Thin-Film as Cathodes of Li-Batteries. *Nanoscience and Nanotechnology Letters*, 8(12), pp.1095-1098.
32. Ota, S., Wang, S., Ryu, J., Wang, Y., Chen, Y. and Zhang, X., 2013. Intracellular delivery of top-down fabricated tunable nano-plasmonic resonators. *Nanoscale*, 5(21), pp.10179-10182.
33. Zhang, X., Zhu, J., Haldolaarachchige, N., Ryu, J., Young, D.P., Wei, S. and Guo, Z., 2012. Synthetic process engineered polyaniline nanostructures with tunable morphology and physical properties. *Polymer*, 53(10), pp.2109-2120.
34. Zhu, J., Zhang, X., Haldolaarachchige, N., Wang, Q., Luo, Z., Ryu, J., Young, D.P., Wei, S. and Guo, Z., 2012. Polypyrrole metacomposites with different carbon nanostructures. *Journal of Materials Chemistry*, 22(11), pp.4996-

5005.

35. Ryu, J., Kim, H.S. and Hahn, H.T., 2011. Reactive sintering of copper nanoparticles using intense pulsed light for printed electronics. *Journal of Electronic Materials*, 40(1), pp.42-50.
36. Kang, J.S., Ryu, J., Kim, H.S. and Hahn, H.T., 2011. Sintering of inkjet-printed silver nanoparticles at room temperature using intense pulsed light. *Journal of electronic materials*, 40(11), p.2268.
37. Wang, S., Ota, S., Guo, B., Ryu, J., Rhodes, C., Xiong, Y., Kalim, S., Zeng, L., Chen, Y., Teitell, M.A. and Zhang, X., 2011. Subcellular resolution mapping of endogenous cytokine secretion by nano-plasmonic-resonator sensor array. *Nano letters*, 11(8), pp.3431-3434.
38. Zhu, J., Wei, S., Zhang, L., Mao, Y., Ryu, J., Karki, A.B., Young, D.P. and Guo, Z., 2011. Polyaniline-tungsten oxide metacomposites with tunable electronic properties. *Journal of Materials Chemistry*, 21(2), pp.342-348.
39. Zhu, J., Wei, S., Zhang, L., Mao, Y., Ryu, J., Haldolaarachchige, N., Young, D.P. and Guo, Z., 2011. Electrical and dielectric properties of polyaniline–Al₂O₃ nanocomposites derived from various Al₂O₃ nanostructures. *Journal of Materials Chemistry*, 21(11), pp.3952-3959.
40. Li, Y., Zhu, J., Wei, S., Ryu, J., Sun, L. and Guo, Z., 2011. Poly (propylene)/graphene nanoplatelet nanocomposites: melt rheological behavior and thermal, electrical, and electronic properties. *Macromolecular Chemistry and Physics*, 212(18), pp.1951-1959.
41. Zhu, J., Wei, S., Ryu, J. and Guo, Z., 2011. Strain-sensing elastomer/carbon nanofiber “metacomposites”. *The Journal of Physical Chemistry C*, 115(27), pp.13215-13222.
42. Kim, H.S., Huh, J. and Ryu, J., 2010. Investigation of moisture-induced delamination failure in a semiconductor package via multi-scale mechanics. *Journal of Physics D: Applied Physics*, 44(3), p.034007.
43. Ryu*, J., Kim, H.S., Hahn, H.T. and Lashmore, D., 2010. Carbon nanotubes with platinum nano-islands as glucose biofuel cell electrodes. *Biosensors and Bioelectronics*, 25(7), pp.1603-1608.
44. Ryu*, J., Kim, K., Kim, H.S., Hahn, H.T. and Lashmore, D., 2010. Intense pulsed light induced platinum–gold alloy formation on carbon nanotubes for non-enzymatic glucose detection. *Biosensors and Bioelectronics*, 26(2), pp.602-607.
45. Ryu*, J., Kim, H., Lee, S., Hahn, H.T. and Lashmore, D., 2010. Carbon nanotube mat as mediator-less glucose sensor electrode. *Journal of nanoscience and nanotechnology*, 10(2), pp.941-947.
46. Kang, J.S., Kim, H.S., Ryu, J., Hahn, H.T., Jang, S. and Joung, J.W., 2010. Inkjet printed electronics using copper nanoparticle ink. *Journal of Materials Science: Materials in Electronics*, 21(11), pp.1213-1220.
47. Zhu, J., Wei, S., Ryu, J., Sun, L., Luo, Z. and Guo, Z., 2010. Magnetic epoxy resin nanocomposites reinforced with core– shell structured Fe@ FeO nanoparticles: fabrication and property analysis. *ACS Applied Materials & Interfaces*, 2(7), pp.2100-2107.
48. Zhu, J., Wei, S., Zhang, L., Mao, Y., Ryu, J., Mavinakuli, P., Karki, A.B., Young, D.P. and Guo, Z., 2010. Conductive polypyrrole/tungsten oxide metacomposites with negative permittivity. *The Journal of Physical Chemistry C*, 114(39), pp.16335-16342.
49. Zhu, J., Wei, S., Ryu, J., Budhathoki, M., Liang, G. and Guo, Z., 2010. In situ stabilized carbon nanofiber (CNF) reinforced epoxy nanocomposites. *Journal of Materials Chemistry*, 20(23), pp.4937-4948.
50. Ryu*, J., Dehlinger, D., Heller, M. and Hahn, T., 2009. Electrophoretic Layer-by-Layer Assembly of Biotin/Avidin Functionalized Nanoparticles. *Particle & Particle Systems Characterization*, 26(5-6), pp.275-282.

Refereed Conference Proceedings and Papers

1. Rizkalla, M., et al., “Interfacing Nanoparticles to CMOS Quad Instrumentation Amplifiers for Gas Sensing Devices,” National Aerospace and Electronics Conference (NAECON), 2015
2. Ryu, J., et al., “Mediator-Less Glucose Biosensor Based on Carbon Nanotube Mat,” *23rd Technical conference proceeding*, American Society of Composites, 2008
3. Kim, H.S., et al., “Investigation of CNT with Pt Nano-Bump Composite as Sugar Fuel Cell Electrodes,” *Asian-Australasian Conference on Composite Materials*, Taipei, Taiwan, Nov 15, 2010
4. Ryu, J., et al., “Carbon Nanotube Mat Biocomposite for Enzymatic Glucose/O₂ Biofuel Cell,” *ANTEC 2009 proceeding*, Society of Plastics Engineers, pp. 530 – 534, 2009

Conference Presentations and Abstracts

1. Ryu, J., et al. “Scalable Nanomanufacturing of Mid-Wavelength Infrared Metasurface based on Low-Cost Sulfuric Polymer,” ASME IMECE, Salt Lake City, UT, Nov. 14, 2019 (presentation)
2. Ryu, J., et al. “Electrically tunable midwavelength infrared metasurface based on a metacomposite substrate film,” ASME IMECE, Salt Lake City, UT, Nov. 14, 2019 (presentation)
3. An, B., et al., “Design of Microwave Absorption Structures Based on Magnetite Multi-Granule Nanocluster–Multiwall Carbon Nanotube Composite Materials,” MRS Fall meeting, Boston, MA, Nov. 25, 2018 (poster)
4. Mansouri, M. et al. “Selective Patterning of Metallic Layers on the 3D Printed Polymers Based on Hygroscopic Swelling Behavior of Two Different Materials,” Bulletin of the American Physical Society, APS March Meeting Mar. 5, 2018, Los Angeles, CA (poster)

5. Oh, B., et al., "Nanoimprint-Lithographically Fabricated Stacked 1D Gratings for Improved MWIR Polarization Detection," Meta Conference 2017, Incheon, Korea, July 25-28 (presentation)
6. Oh, B., et al., "Stacked 1D Subwavelength Gratings for Improved Mid-IR Polarization Extinction Ratio," International Symposium on the Physics of Semiconductors and Applications, Jeju, Korea, 2016 (presentation)
7. Mosey, A., et al., "Magnetic Field Assisted Cobalt Nanoparticle Synthesis," 61st MMM conference, New Orleans, LA, Oct. 21, 2016 (presentation)
8. Salcedo, E., et al., "3-Dimensional Designed Novel Substrate for Flexible Hybrid Electronics," 2016 Flex Conference, Monterey, CA, Feb. 29, 2016 (presentation)
9. Goel, T., et al., "Interfacing Nanoparticles to CMOS Quad Instrumentation Amplifiers for Gas Sensing Devices," National Aerospace Electronics Conference, Dayton, OH, June 16, 2015 (presentation)
10. D. Wyman, W. A. Gill, B.-H. An, J. Ryu, D.S. Choi, "Synthesis of Copper Nanostructures on 3-Dimensional Printed Polymer Substrates," MRS Spring Meeting, 2015 (poster)
11. A. Kulkarni, J. Kim, X. Yan, J. Ryu, Z. Guo, I. Seok, "Au Nanoparticle Assembly on Carbon Nanotubes using Flash Induced Solid State Dewetting," MRS Spring Meeting, 2015 (poster)
12. S. Al Mheiri, D. Choi, J. Yoo, J. E. Ryu, J. Park, "Wearable Smart On-chip Wireless H₂S Sensor for Oil Exploration," ADRAC International Conference & Exhibition 2014, Feb. 24-26 (presentation)
13. S. Wang, S. Ota, B. Guo, J. Ryu, C. Rhodes, Y. Xiong, S. Kalim, L. Zeng, Y. Chen, M. Teitell, others (2011). High Spatial Resolution Sensing of Cytokine Secretion by Nano-Plasmonic-Resonator Array. *Frontiers in Optics* (pp. FTuE4) (presentation)
14. H.S. Kim, J. Ryu, H. T. Hahn, "Investigation of CNT with Pt nano-bump composite as sugar fuel cell electrodes," *Asian-Australasian Conference on Composite Materials*, Taipei, Taiwan, Nov 15. 2010 (presentation)
15. J. Ryu, H.S. Kim, H.T. Hahn, D. Lashmore, "Mediator-less glucose biosensor based on carbon nanotube mat," *ASC 23rd Technical Conference*, USA, Sept. 2008 (presentation)
16. J. Ryu, H.T. Hahn, D. Lashmore, "Mediator-less glucose sensor based on carbon nanotube mat electrode," *US-Korea Conference*, San Diego, USA, Aug. 2008 (presentation)

Patents

1. J. Ryu, "Ink Reinforcement for Printed Electronics" (2017, WO2017091581A1)
2. J. Ryu, "Polymer Infrared Polarizer", U.S. Provisional Application No. 62/575,169

INVITED SEMINARS AND TALKS

Local

<u>Title</u>	<u>Organization</u>	<u>Date</u>
Nanomanufacturing for flexible substrates	Physics, IUPUI	2014/02/19
Printed Materials and Manufacturing	BME, IUPUI	2017/01/20
Printed Materials and Manufacturing	IU School of Medicine	2017/02/03

Regional

<u>Title</u>	<u>Organization</u>	<u>Date</u>
Manufacturing Technologies for Printed Functional Materials	NASA Langley Research Center	2019/04/15

National

<u>Title</u>	<u>Organization</u>	<u>Date</u>
Nanofabrication on Polymeric Substrates for Energy Harvest Structures and Biological Applications	University of Idaho, Moscow	2010/04/20
Advanced Manufacturing for Flexible Electronics and Nanoscale Systems	AFRL, Dayton, Ohio	2015/07/29
Printed Materials and Manufacturing	Boise State University	2016/10/26
Design of highly flexible and elastic electronic substrates using additive manufacturing	IU-NSWC	2016/10/13
Composite Materials for Photonics	Naval Research Laboratory, VA	2019/07/16

International

<u>Title</u>	<u>Organization</u>	<u>Date</u>
Printed Materials and Manufacturing	Zhengzhou University, China	2018/01/04
Printed Materials and Manufacturing	Kyungpook National University; Changwon National University; Inha University; Korea Research Institute of Standards and Science	2017/07/19-24
Flexible Electronics (Short Lecture Series)	Kumoh National Institute of Technology, Korea	2017/07/18-19
Scalable nanomanufacturing and biomedical applications - Nanoimprint and photothermal self-assembly	Masdar Institute of Science and Technology, UAE; Khalifa University, UAE	2015/12/15-16

Graduate Thesis Mentor

Thesis Chair: A. Kulkarni (MS, 2015), J. Kim (MS, 2016), E. Salcedo (MS, 2017), A. Berndt (MS, 2018), M.D. Islam (PhD, present), S. Liu (MS, present)

Committee: H. Zhang (MS, 2016), S. Chandwadkar, M. Bell, J. Najmon (MS, 2017), H. Steele (MS, 2018)