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

GRADUATE

University of California, LA	Ph.D. Mechanical Engineering	2009
	(Chair: Prof. Thomas Hahn, Dissertation "*Nanomanufacturing Processes for Biofuel Cells and Sensors*")	
KAIST, Korea	M.S. Mechanical Engineering	2006

UNDERGRADUATE

KAIST, Korea	B.S. Mechanical Engineering	2004

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

PROFESSIONAL HONORS AND AWARDS:

Award Name	Granted By	Date Awarded
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: Multifunctional and Multiphysics Composites; Metamaterials; Nanomanufacturing; Additive manufacturing; Functional material printing

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

PROFESSIONAL ORGANIZATION MEMBERSHIPS:

Organization	Inclusive Dates
Editorial Board of Advanced Composites and Hybrid Materials	2017 – present
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:

Organization	**Activity**	**Inclusive Dates**
Advanced Composites and Hybrid Materials	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

PUBLICATIONS: * in-rank publications; ** NCSU publications

Refereed Journal Papers

1. * ** “Fabrication of graphene-magnetite multi-granule nanocluster composites for microwave absorption application,” Under Review (2018)
2. * ** “A Combined Modeling and Experimental Study of Tensile Properties of Additively Manufactured Polymeric Materials” Under Review (2018)
3. * ** J. Kim et al. "Fabry-Perot cavity resonance enabling highly polarization-sensitive double-layer gold grating" *accepted* (2018)
4. * ** “Microwave absorption properties of magnetite multi-granule nanocluster–multiwall carbon nanotube composites,” *accepted* (2018)
5. * ** J Ryu et al. “Material Models and Finite Analysis of Additively Printed Polymer Composites,” Journal of Composite Materials (2018) https://doi.org/10.1177/0021998318785672
6. * ** M Mansouri, et al. “Fabrication of three-dimensional electrical patterns by swollen-off process: An evolution of the lift-off process,” Current Applied Physics, (2018) https://doi.org/10.1016/j.cap.2018.06.001
7. * ** E. Salcedo, D. Baek, A. Berndt, J.E. Ryu, “Simulation and Validation of Three Dimension Functionally Graded Materials by Material Jetting,” Additive Manufacturing, 22, 351-359 (2018)
8. * J. Zhao, L. Wu, C. Zhang, T. Li, Q. Jiang, F. Wang, P. Zhao, J.E. Ryu, Z. Guo, “Ionic liquid-assisted synthesis of Yb3+-Tm3+ Codoped Y7O6F9 Petal Shaped Microcrystals with enhanced upconversion emission,” Materials Research Bulletin, 103, pp. 19-24 (2018)
9. * D. Choi, E.H. Yang, W. Gill, A. Berndt, J.R. Park, J.E. Ryu, “Fabrication and Electrochemical Characterization of Super-Capacitor Based on Three-Dimensional Composite Structure of Graphene and a Vertical Array of Carbon Nanotube,” Journal of Composite Materials, (2018) https://doi.org/10.1177/0021998318760154
10. * M. Zhao, L. Meng, L. Ma, L. Ma, X. Yang, Y. Huang, J.E. Ryu, A. Shankar, T. Li, C. Yan, Z. Guo, “Layer-by-Layer Grafting CNTs onto Carbon Fibers Surface for Enhancing the Interfacial Properties of Epoxy Resin Composites,” Composite Science and Technology, 154, 28-26 (2017)
11. * A. Shankar, E. Salcedo, A. Berndt, D. Choi, J.E. Ryu, “Pulsed Light Sintering of Silver Nanoparticles for Large Deformation of Printed Stretchable Electronics,” Advanced Composites and Hybrid Materials, DOI: 10.1007/s42114-017-0012-3 (2017)
12. * J. R. Park, A. Berndt, Y. K. Kim, J. S. Lee, J. E. Ryu, D. Choi, “Formation of high aspect ratio fused silica nanowalls by fluorine-based deep reactive ion etching,” Nano-Structures & Nano-Objects (2017) 10.1016/j.nanoso.2017.10.004
13. * C. Cheng, R. Fan, Z. Wang, Q. Shao, X. Guo, P. Xie, Y. Yin, Y. Zhang, L. An, Y. Lei, J. Ryu, A. Shankar, Z. Guo, “Tunable and weakly negative permittivity in carbon/silicon nitride composites with different carbonizing temperatures,” Carbon, 125, pp. 103-112 (2017)
14. * K. Sun, P. Xie, Z. Wang, T. Su, Q. Shao, J.E. Ryu, X. Zhang, J. Guo, A. Shankar, J. Li, R. Fan, D. Cao and Z. Guo, “Flexible polydimethylsiloxane/multi-walled carbon nanotubes membranous metacomposites with negative permittivity,” Polymer, 125, pp. 50-57 (2017)
15. * A. Chen, L. Wang, B.-Y. Li, J. Sherman, J.E. Ryu, K. Hamamura, Y. Liu, H. Nakshatri, H. Yokota, “Reduction in Migratory Phenotype in a Metastasized Breast Cancer Cell Line via Downregulation of S100A4 and GRM3,” Scientific Reports, 7, pp. 3459 (2017)
16. * Y. Cao, J. Huang, X. Peng, D. Cao, A. Galaska, S. Qiu, J. Liu, M.A. Khan, D.P. Young, J.E. Ryu, H. Feng, N. Yerra, Z. Guo, "Poly (vinylidene fluoride) derived fluorine-doped magnetic carbon nanoadsorbents for enhanced chromium removal," Carbon, 115, pp. 503-514 (2017)
17. * T. TruongVo, R. Kennedy, H. Chen, A. Chen, A. Berndt, M. Agarwal, L. Zhu, H. Nakshatri, J. Wallace, S. Na, H.

Yokota, J. Ryu, “Microfluidic Channel for Characterizing Normal and Breast Cancer Cells,” J. Micromech. Microeng. 27, pp. 035017 (2017)
18. * X. Hopkins, W. Gill, R. Kringel, G. Wang, J. Hass, S. Acharya, J. Park, I.-T. Jeon, B.H. An, J. Lee, J. Ryu, R. Hill, D. McIlroy, Y.K. Kim, D. Choi, “Radio frequency hyperthermia for destruction of pancreatic tumors using nickel-gold core-shell nanowires,” Nanotechnology, 28, 03LT01 (2017)
19. * A. Mosey, B.R. Gaire, J. Kim, J.E. Ryu, R. Cheng, "Tunable cobalt nanoparticle synthesis by intense pulse flash annealing," AIP Advances, 7, pp. 056308 (2017)
20. * W. Gill, D. Ali, D. Choi, J. Park, J. Ryu, Y.K. Lee, "3 Dimensional-Printed Micro-Container with Graphene Current Collector and Manganese Oxide Thin-Film as Cathodes of Li-Batteries," Nanosci. Nanotechnol. Lett. 8, pp. 1095–1098 (2016)
21. * T. Espich, E. Salcedo, A. Kulkarni, D. Choi, J. Ryu, "Scalable Nanoparticle Assembly on Carbon Nanotubes using Flash Induced Dewetting," Journal of Composite Materials, 51 (9), pp. 1299-1305 (2016)
22. * J. Kim, A. Shankar, J. Zhu, Z. Guo, D. Choi, J.E. Ryu, "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 (2016)
23. * D. Choi, B.H. An, M. Mansouri, D. Ali, M. Khalil, K. Xu, D. Nwoke, J.R. Park, A. Shankar, J.E. Ryu, "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 (2016)
24. * S. Ota, S. Wang, J. Ryu, Y. Wang, Y. Chen, X. Zhang, “Intracellular delivery of top-down fabricated tunable nano-plasmonic resonators,” Nanoscale, 5, 10179-10182, 2013
25. X. Zhang, J. Zhu, N. Haldolaarachchige, J. Ryu, D. Young, S. Wei, Z. Guo, “Synthetic Process Engineered Polyaniline Nanostructures with Tunable Morphology and Physical Properties,” Polymer, Vol 53, pp. 2109 – 2120, 2012
26. J. Zhu, X. Zhang, N. Haldolaarachchige, Q. Wang, Z. Luo, J. Ryu, D. P. Young, S. Wei, Z. Guo, “Polypyrrole Metacomposites with Different Nanostructures,” Journal of Materials Chemistry, Vol. 22, pp. 4996 – 5005, 2012
27. J. Ryu, H.S. Kim, H.T. Hahn, “Reactive sintering of copper nanoparticles using intense pulsed light,” Journal of Electronic Materials, Vol. 40, pp. 42-50, 2011
28. J.S. Kang, J. Ryu, H.S. Kim, H.T. Hahn, S. Jang, J.W. Joung, “Sintering of inkjet printed silver nanoparticles at a room temperature by using the intense pulsed light,” Journal of Electronic Materials, Vol 40, pp. 2268-2277, 2011
29. S. Wang, S. Ota, B. Guo, J. Ryu, C. Rhode, Y. Xiong, S. Kalim, L. Zeng, Y. Chen, M. Teitell, X. Zhang, “Subcellular Resolution Mapping of Endogenous Cytokine Secretion by Nano-Plasmonic-Resonator Sensor Array,” Nano Letters, Vol. 11, pp. 3431-3434, 2011
30. H.S. Kim, J. Huh, J. Ryu, “Investigation of moisture induced delamination failure in a semiconductor package via multi-scale mechanics,” Journal of Physics D: Applied physics, Vol. 44, pp. 034007, 2011
31. Z. Guo, J. Zhu, S. Wei, L. Zhang, Y. Mao, J. Ryu, N. Haldolaarachchige, A. Karki, D. Young, “Polyaniline-tungsten oxide metacomposites with tunable electronic properties,” Journal of Materials Chemistry, Vol. 21, pp. 342-348, 2011
32. J. Zhu, S. Wei, L. Zhang, Y. Mao, J. Ryu, N. Haldolaarachchige, D. Young, Z. Guo, “Electrical and dielectric properties of polyaniline–Al2O3 nanocomposites derived from various Al2O3 nanostructures,” Journal of Materials Chemistry, Vol. 21, pp. 3952-3959, 2011
33. Y. Li, J. Zhu, S. Wei, J. Ryu, L. Sun, Z. Guo, “Poly(propylene)/Graphene Nanoplatelets Nanocomposites: Melt Rheological Behaviors and Thermal, Electrical and Electronic Properties,” Macromolecular Chemistry and Physics, Vol. 212, pp. 1951-1959, 2011
34. J. Zhu, S. Wei, J. Ryu, Z. Guo, “Strain Sensing Elastomer/Carbon Nanofibers ‘Metacomposites’,” Journal of Physical Chemistry C, Vol. 115, pp. 13215-13222, 2011
35. J. Ryu, H.S. Kim, H.T. Hahn, D. Lashmore, “Carbon nanotubes with platinum nano-islands as glucose biofuel cell electrodes,” Biosensors and Bioelectronics, Vol. 25, pp. 1603-1608, 2010
36. J. Ryu, K.H. Kim, H.S. Kim, H.T. Hahn, D. Lashmore, “Intense pulsed light induced platinum-gold alloy formation on carbon nanotubes for non-enzymatic glucose detection,” Biosensors and Bioelectronics, Vol. 26, pp. 602-607, 2010
37. J. Ryu, H.S. Kim, S.E. Lee, H.T. Hahn, D. Lashmore, “Carbon nanotube mat as mediator-less glucose sensor electrode,” Journal of Nanoscience and Nanotechnology, Vol. 10, pp. 941-947, 2010
38. J.S. Kang, H.S. Kim, J. Ryu, H.T. Hahn, S.H. Jang, J.W. Joung, “Inkjet printed electronics using copper nanoparticle ink,” Journal of Materials Science: Materials in Electronics, Vol. 21, pp. 1213-1220, 2010
39. J. Zhu, S. Wei, J. Ryu, L. Sun, Z. Luo, Z. Guo, “Magnetic epoxy resin nanocomposites reinforced with core-shell structured Fe@FeO nanoparticles: fabrication and property analysis,” ACS Applied Materials & Interfaces, Vol. 2, pp. 2100-2107, 2010
40. J. Zhu, L. Zhang, Y. Mao, P. Mavinakuli, D. Young, Z. Guo, S. Wei, J. Ryu, A. Karki, “Conductive polypyrrole/tungsten oxide metacomposites with negative permittivity,” Journal of Physical Chemistry C, Vol. 114, pp. 16335-16342, 2010
41. J. Zhu, S. Wei, J. Ryu, M. Budhathoki, G. Liang, Z. Guo, “In-situ stabilized carbon nanofibers (CNFs) reinforced epoxy nanocomposites,” Journal of Materials Chemistry, Vol. 20, pp. 4937-4948, 2010

42. J. Ryu, D. Dehlinger, M.J. Heller, H.T. Hahn, “Electrophoretic layer-by-layer assembly of biotin/avidin functionalized nanoparticles,” Particle and Particle System Characterization, Vol. 26, pp. 275-282, 2009

Refereed Conference Proceedings and Papers

1. * M. Rizkalla, J. Ryu, V. K. Suryadevara, J. Tschudy, “Interfacing nanoparticles to CMOS quad instrumentation amplifiers for gas sensing devices,” National Aerospace and Electronics Conference (NAECON), 2015
2. J. Ryu, H.S. Kim, H.T. Hahn, D. Lashmore, “Mediator-less glucose biosensor based on carbon nanotube mat,” *23rd Technical conference proceeding*, American Society of Composites, 2008
3. 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
4. J. Ryu, T. Saotome, H.T. Hahn, D. Lashmore, “Carbon nanotube mat biocomposite for enzymatic glucose/O_2 biofuel cell,” *ANTEC 2009 proceeding*, Society of Plastics Engineers, pp. 530 – 534, 2009

Conference Presentations and Abstracts

1. * ** “Design of Microwave Absorption Structures Based on Magnetite Multi-Granule Nanocluster–Multiwall Carbon Nanotube Composite Materials,” MRS Fall 2018 (poster)
2. * 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. 5-9, 2018, Los Angeles, California (poster)
3. * B. Oh, X. E. Huang, D.-K. Kim, J.O. Kim, S. J. Lee, A. Urbas, Z. Ku, D.A. Czaplewski, I.W. Jung, and J. Ryu, “Nanoimprint-lithographically fabricated stacked 1D gratings for improved MWIR polarization detection,” Meta Conference 2017, Incheon, Korea, July 25-28 (presentation)
4. * B. Oh, J. Kim, D.-K. Kim, J.E. Ryu, J.O. Kim, A. Urbas, Z. Ku, S.J. Lee, “Stacked 1D subwavelength gratings for improved mid-IR polarization extinction ratio,” International Symposium on the Physics of Semiconductors and Applications, Jeju, Korea, 2016 (presentation)
5. * A. Mosey, B. R. Gaire, J. Kim, J. Ryu, R. Cheng, "Magnetic Field Assisted Cobalt Nanoparticle Synthesis," 61st MMM CONFERENCE, New Orleans, LA, Oct. 21. 2016
6. * E. Salcedo, A. Berndt, A. Shankar, and J. Ryu, “3-Dimensional Designed Novel Substrate for Flexible Hybrid Electronics,” 2016 Flex Conference, Feb. 29 – Mar. 03. 2016 (presentation)
7. * T. Goel, M. Rizkalla, J. Ryu and V. K. Suryadevara, "Interfacing Nanoparticles to CMOS Quad Instrumentation Amplifiers for Gas Sensing Devices," National Aerospace Electronics Conference, June 16 - June 19, 2015 (presentation)
8. * 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)
9. * 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)
10. * 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)
11. 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)
12. 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)
13. 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)
14. 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

Title	Organization	Date
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

Title	Organization	Date
Design of highly flexible and elastic electronic substrates using additive manufacturing	IU-NSWC	2016/10/13

National

Title	Organization	Date
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

International

Title	Organization	Date
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)

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