

JAE-WON CHOI, Ph.D.

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APPOINTMENTS

- Sep. 2017 – present **Associate Professor with Tenure**, Mechanical Engineering, The University of Akron (UA), Akron, OH
- Jul. 2018 – Aug 2019 **Visiting Professor**, Pukyong National University (PKNU), Busan, Korea; Invited Scientist at PKNU under Brain Pool Program since April 2019
- Jan. 2011 – Aug. 2017 **Assistant Professor, Director of Advanced Additive Manufacturing Lab (AAML)**, Mechanical Engineering, UA
- Jan. 2011 – Aug. 2011 **Adjunct Assistant Professor**, Mechanical Engineering, The University of Texas at El Paso (UTEP), TX
- Sep. 2009 – Dec. 2010 **Research Assistant Professor and Lecturer** in the W.M. Keck Center for 3D Innovation (Keck Center), Mechanical Engineering, UTEP
- Oct. 2007 – Aug. 2009 **Postdoctoral Researcher (2007 – 2008), Research Specialist (2008 – 2009)** in the Keck Center, Mechanical Engineering, UTEP
- Mar. 2007–Aug. 2007 **Postdoctoral Researcher** in Production Automation Lab., Mechanical and Intelligent Systems Engineering, Pusan National University (PNU), Busan, South Korea
- Sep. 2004 – Feb. 2007 **Research Assistant** in Mechanical and Intelligent Systems Engineering, PNU
- Mar. 2001– Nov. 2006 **Technical Research Personnel** as an alternative military service, PNU
(acquired qualification for pursuing a Ph.D. degree by passing a national examination)
- Jun. 2000 – Dec. 2005 **Research Assistant** in Pusan Kyoungnam Automotive Technology (PKATEC), PNU
(Reserve Engineering research and service: operation of Surveyor 1200™ as a 3D laser scanner, and Reserve Engineering software)

EDUCATION

- Feb. 2007 **Ph.D.**, Department of Mechanical and Intelligent Systems Engineering, PNU
Dissertation: *Development of Projection-based Microstereolithography Apparatus Adapted to Large Surface and Microstructure Fabrication for Human Body Application*
(Advisor: Seok-Hee Lee, Ph.D.; sehlee@pusan.ac.kr)
- Feb. 2001 **M.S.**, Department of Mechanical and Intelligent Systems Engineering, PNU
Thesis: *A Study on Generation of Free-Form Surface from Measuring Point using Laser*

Scanner (Advisor: Seok-Hee Lee, Ph.D.)

Feb. 1999

B.S., School of Mechanical Engineering, PNU

TEACHING

- **Aerospace Systems Manufacturing**, Undergrad course, Mechanical Eng. Dept. at UA
- **3D Printing and Additive Manufacturing**, Undergrad/Grad course, Mechanical Eng. Dept. at UA
- **ME Lab – 3D Scanning and Printing**, Undergraduate, Mechanical Eng. Dept. at UA
- **CAD/CAM**, Undergrad/grad course, Mechanical Eng. Dept. at UA
- **Tools for Mechanical Engineering (Lecture/Lab.)**, Undergrad course, Mechanical Eng. Dept. at UA
- **Kinematics of Machines**, Undergrad course, Mechanical Eng. Dept. at UA
- **Micro/Nano Engineering**: Grad course in Ph.D. program of Material Science and Engineering (MASE 5390) and Metallurgical and Materials Engineering Dept. (MME 5390) at UTEP, TX (Fall 2009)
- **Mechanics of Materials, Mechanical Vibration, and Computer Programming**: Undergrad courses, Mechanical and Automotive Eng. Dept. at Andong National University, S. Korea (Spring 2007)

RESEARCH INTERESTS

- **Advanced Additive Manufacturing**: Design and Development of Multi-Material, Multi-Scale Additive Manufacturing; Combined Additive Manufacturing; Conformal Additive Manufacturing; Biomimicry 3D Printing; 3D Printing of Ceramics; 3D Printing of Real Rubber
- **Materials for Additive Manufacturing**: Rheology-Controlled Photopolymers; Smart Polymers/Nanocomposites; Bio-Materials; Binder-coated Ceramics; Rubbery Materials
- **Smart Structures**: 3D Sensors, Actuators, and Electronics; Biomimetic Robotic Tactile Sensors
- **Biomedical Engineering**: Computer-Aided Tissue Engineering; Transdermal Drug Delivery System; Scaffold Fabrication; Artificial Nerve Guidance Conduits; Biomedical Devices; 3D Printing of Sustainable Materials

AWARDS (Including Advisor Role)

Nov 2019	First place, Mr. Omar Emon's Monte Jade Innovation Competition (MJIC) student competition (advisor)
March 2018	UA Faculty Research Grant Award (3D Printing of Smart Tires, \$10,000)
June 2016	Young Researcher Award, International Symposium on Green Manufacturing and Applications (ISGMA 2016), June 21 – 25, Bali, Indonesia
April 2015	Best Post Presentation, The 11 th Annual University of Akron Student Innovation Symposium (UASIS): A Showcase of Research (advisor)
March 2015	UA Leading Entrepreneurial Academics into Practice (LEAP) (Technology Validation for 3D Printed Tactile Sensors, \$25,000)
March 2015	UA Faculty Research Grant Award (Multi-scale 3D Printing of Microneedle Arrays for Early-

	stage Melanoma, \$10,000)
May 2013	Best Paper Award at International Conference on Manufacturing, Design and Tribology (ICMDT), Busan, S. Korea, 2013 (corresponding author)
Oct 2007	Overseas Postdoctoral Fellowship (KRF-2007-357-D00023), Korea Research Foundation (\$20,000)

GRANTS RECEIVED (Total external funding since joining UA in 2011: ~\$1,532,547)

- (1) *IUCRC Phase III University of Akron: Center for Tire Research (CenTiRe)*, NSF, \$249,995, co-PI, under review.
- (2) *MCA: Mechanoelectrical Energy Conversion in Freeform Solid Polymer Electrolytes Fabricated by Multi-Material Conformal Additive Manufacturing*, July 2021 – June 2024, NSF CMMI, \$329,315, PI, under review.
- (3) *SBIR Phase II: SmartRun Monitor for Gait and Form Analytics*, Mar 1 2021 – Feb 28 2023, NSF through eSens, \$169,079, PI-subaward (100% credit). eSens received ~\$1M, where Choi is a co-founder and CTO.
- (4) *Thorz Battery - All-Solid-State Polymer Batteries Enabled by Conformal Additive Manufacturing, NSF IIP – I-Corps Teams*, June 1 2021 – May 31 2022, \$50,000, PI (active, 50% credit).
- (5) *Hybrid Manufacturing of Conductive Patterns on a 3D Surface*, DMT, April 1 2020 – March 31 2023, \$222,324, PI (active, 100% credit).
- (6) *3D Printed Smart Tires for Health Monitoring*, CenTiRe, Aug 1 2018 – July 31 2021, \$207,900, PI (active, 100% credit).
- (7) *Multi-scale 3D Printing Using Vat-free Photopolymerization*, NSF CMMI – MME, Aug 1 2016 – July 31 2021, \$303,501, PI (100% credit).
- (8) *STTR Phase I: SmartRun Monitor for Gait and Form Analytics*, NSF through eSens LLC, June 1 2019 – Dec 31 2020, \$106,198, PI-subaward (100% credit).
- (9) *RoboSense – Artificial Tactile Sensors for Prosthetic Applications*, NSF I-Corps Teams, July 1 2015 – Dec 31 2016, \$50,000, PI (100% credit).
- (10) *Artificial Tactile Sensors using Hybrid 3D Printing Technologies*, Ohio 3rd Frontier, Technology Validation and Startup Funds, Sep 1 2015 – Aug 31 2016, \$50,000, PI (100% credit).
- (11) *Concussion Detection Sensors*, NSF I-Corps Sites, April 1 2015 – August 31 2015, \$2,500, Academic lead, funded.
- (12) *Artificial Tactile Sensors*, NSF I-Corps Sites, Nov 1 2014 – April 30 2015, \$2,500, Academic lead (100% credit).
- (13) *Flexible Tactile Sensor with 30% Flexibility using Hybrid Additive Manufacturing Technology*, Korea Institute for Advancement of Technology (KIAT) under Korea Ministry of Knowledge Economy, 08/01/2012 – 07/31/2015, \$268,697, PI (100% credit).
- (14) *Development of Automotive MID Parts using Direct Write Technology*, Korea Association of Industry, Academy, and Research Institute (KAIARI) under Korea Small & Medium Business Administration, 06/01/2012 – 05/31/2014, \$104,848, PI (100% credit).
- (15) *Development of Fusion Process for Fabrication of 3D Biodegradable Scaffolds and Investigation of Cell Culture according to Inner Geometry of Scaffolds*, Korea Research Foundation (KRF), Overseas Postdoctoral Fellowship

(KRF-2007-357-D00023), 10/1/2007 – 9/30/2008, \$20,000, PI (100% credit).

ACTIVITIES

(1) Journal Editorial Membership

- Additive Manufacturing (Elsevier, IF: 10.998; CiteScore: 11.6): Associate Editor (Oct 2019 – Present); Editorial Board Member (2014 – 2019)
- International Journal of Precision Engineering and Manufacturing – Green Technology (IJPEM-GT, Springer, IF: 5.671): Editorial Board Member (2017 – Present)
- International Journal of Precision Engineering and Manufacturing (IJPEM, Springer, IF: 2.106): Editorial Board Member (2019 – Present)
- Korean Society of Manufacturing Processing Engineers (KSMPE): Editor (2019 – Present); Associate Editor (2014-2018)
- Guest Editor of Journal Sensors (MDPI, 2016-2017): Special Issue “3D Printed Sensors”
(http://www.mdpi.com/journal/sensors/special_issues/3D_printed_sensors)

(2) Research Collaborations

- Techbelt Team (Ohio + Pennsylvania): Original proposal writing team for participating the competition to bring the pilot institute on Additive Manufacturing as one of National Network for Manufacturing Innovation (NNMI) initiated by the President. The team won the competition with a \$30M federal contribution, and established National Additive Manufacturing Innovation Institute (NAMII) located in Youngstown, OH in 2012.

(3) Conference/Symposium/Workshop

- Panelist in IEEE Sensors – 3D Printed Sensors: Opportunities and Challenges, October 28, 2020, Rotterdam, Netherlands
- International Symposium on Precision Engineering and Sustainable Manufacturing (PRESM) 2019 (Da Nang, Vietnam), 2021 (Jeju, Korea): Organizing Committee Member
- US-Korea Joint Conference (UKC) 2018 (New York, NY): Session Organizer for 3D Printing and Advanced Manufacturing
- International Symposium on Green Manufacturing and Applications (ISGMA) 2017: Organizing Committee Member
- ISGMA 2014 (Busan, Korea), 2015 (Cheongdo, China), 2016 (Bali, Indonesia): Session Organizer/Chair (3D Printing)
- MSEC 2017 (Univ. of Southern California), 2018 (Texas A&M Univ.): Symposium Co-Organizer for Advances in Micro- and Nano-Additive Manufacturing
- ASME IMECE 2016 (Phoenix, AZ) and 2017 (Tampa, FL): Track Co-Organizer of Advanced Manufacturing
- ASME IMECE 2013 (San Diego), 2014 (Montreal, Canada), 2015 (Houston): Additive Manufacturing Topic Organizer, Session Chair, and Reviewer

- 252nd American Chemical Society National Meeting: Polymers designed for 3D printing applications: evaluation of the fundamental and applied aspects of the field, Co-Organizer, August 22-24, 2016, Philadelphia
- 30th International Conference of Polymer Processing Society (PPS) 2014: Symposium Organizer and Reviewer (Additive Manufacturing), Cleveland, OH
- International Conference on Control, Automation and Systems (ICCAS) 2013: Special Session Organizer, Chair, Reviewer (Flexible Tactile Sensors for Robotic Applications), Jeju, Korea

(4) Proposal Reviewer

- Applied and Engineering Researches, Israel Ministry of Science, Technology and Space
- NSF CMMI – BRITE, MME, MRI, SBIR/STTR
- Leaders New Opportunity, Canada Foundation for Innovation (CFI) and the Quebec Government

(5) Journal/Conference Reviewer

- Journals: Acta Biomaterialia; Sensors; Additive Manufacturing; Biofabrication; Sensors and Actuators A – Physical; Rapid Prototyping Journal; International Journal of Advanced Manufacturing Technology; International Journal of Optomechatronics; Journal of Mechanical Science and Technology; ASME Journal of Electronic Packaging; ASME Journal of Manufacturing Science and Engineering; Journal of Nanotechnology; International Journal Precision Engineering and Manufacturing, IJPEM-Green Technology; Critical Reviews in Food Science and Nutrition; IEEE Access
- Conference: ASME IMECE, ICCAS, PPS, ASME MSEC

(6) K-12 Outreach

- Judge in District Science Day in 2021 and 2021

(7) Technical affiliation

- SME – Society of Manufacturing Engineers, Regular member, 2011 – present.
- SPIE – The International Society for Optical Engineering, Life time member
- ASME – American Society of Mechanical Engineers, Regular member, 2011 – present.

(8) Entrepreneurial Activities/Consulting

- eSens (founded in 2015): Co-Founder and CTO, 2015 – present
- Creative Polymer Solution Technology (CPST) – Technical consultant, 2019
- DexAM, Inc. (founded in 2017) – Founder and CTO, 2018 – 2019
- 3D Controls – Technical consultant, 2016 – 2018
- Osstem Implant, Inc. – Technical consultant, 2016 – 2017
- JEIOS – Technical consultant, 2015
- Cuyahoga Community College’s Education Advisory Council, 2014
- 4ENs – Technical consultant, 2013 – 2015
- Chemstress – Technical consultant/translator, 2014

PATENTS

- **Regular**

- (1) **Choi, J.W.**, Emon, M.O.F., “Combined tactile sensors and their signal processing to measure normal and shear deformation,” Provisional patent application (UA1532) submitted in Feb 15 2021 (USPTO: 63/149,398)
- (2) **Choi, J.W.**, Kim, M.E., “Rubber ink formulations for additive manufacturing,” Provisional patent application (UA1531) submitted in Feb 11 2021 (USPTO: 63/148,315)
- (3) Nadkarni, G., Emon, M.O.F., **Choi, J.W.**, “Neuropathy gloves with conformable soft sensors,” Provisional patent application (UA1528) submitted in Jan 16 2021 (USPTO: 63/138,421)
- (4) **Choi, J.W.**, Emon, M.O.F., “Tactile Sensors for Measuring Shear Forces,” Provisional patent application (UA1430) submitted in Nov 16, 2018 (USPTO: 62/768,199); “Flexible Tactile Sensors” filed in Nov 8, 2019.
- (5) **Choi, J.W.**, “Flexible Sensors and Methods for Making the Same.” US 10,816,415 B2 registered in Oct 27 2020, Provisional patent application (UA1259) submitted in Feb 11, 2016 (USPTO: 62/293,829).
- (6) **Choi, J.W.**, Vatani, M., Engeberg, E.D., Kim, H.C., R. Thomas Swiger, “Flexible Tactile Sensors and Method of Making,” US 10,156,487 B2 registered in Dec 18 2018; Provisional patent applications (UA1122/UA1168) filed on March 20 2014 (USPTO: 61/955,863) and Aug 29 2014 (USPTO: 62/043,461).
- (7) **Choi, J.W.**, Engeberg, E., Kim, H.C., Lee, K.S., “Flexible Tactile Sensors and Method of Making,” US 9,664,717 B2 registered on May 30, 2017; Provisional patent application (UA980) filed on April 26, 2012 (USPTO: 61/638,721).
- (8) Kim, H.C., Lee, I.H., Lee, G.C., **Choi, J.W.**, “A Tactile Sensor and Manufacturing Method for Thereof,” applied in April 18 2013 (10-2013-0042792), accepted in Dec 21 2014 (Korean, registration number will be assigned).
- (9) **Choi, J.W.**, Ha, Y.M., Park, I.B., Lee, S.H. “Manufacturing Method Large Area Microstructure,” submitted in Aug 2007 (10-2007-0078035), accepted in Feb 2009 (Korean, 100895864).

- **Provisional Only/Non granted**

- (1) **Choi, J.W.**, Yun, Y. H., “Additive Printing Apparatus and Method Employing Liquid Bridge,” US 2018/0311893 A published Nov 1, 2018; Provisional patent application (UA1243) submitted in Oct 30, 2015 (USPTO: 62/248,730).
- (2) **Choi, J.W.**, Alkadi, F., “Conformal Additive Manufacturing Process,” Provisional patent application submitted in Oct 24, 2018 (USPTO: 62/749,901). Expired.
- (3) **Choi, J.W.**, “3D Structuring on Demand using Liquid Bridge in a Large Area,” Provisional patent application submitted in Nov 22, 2017 (USPTO: 62/589,956). Expired.
- (4) **Choi, J.W.**, Vatani, M., Lu, Y., “Direct-Print Photopolymerization for Multi-Layer, Multi-Material Structures,” Provisional patent application in March 20, 2014 (USPTO: 61/955,854). Expired.

BOOKS/BOOK CHAPTERS

- (1) Tabatabaei, B., Huang, R. and **Choi, J.W.**, “Ch. 12: 3D Printing and Additive Manufacturing,” *Smart*

Manufacturing, The Lean Six Sigma Way edited by Anthony Tarantino, Wiley, In-Press.

- (2) Kim, H.C., Yun, H.Y., Lee, I.H., Park, K., Kim, C.Y., Ahn, D.G., **Choi, J.W.**, “Development of 3D Printers,” National Competency Standards (NCS) Learning Modules, Andong National University and Korea Research Institute for Vocational Education & Training (KRIVET), ISBN: 979-11-339-4789-8, Feb 28, 2017 (written in Korean).
- (3) Lee, I.H., Bae, Y.H., Yun, H.Y., **Choi, J.W.**, Kim, H.S., Kim, H.C., “Development of Products using 3D Printing,” NCS Learning Modules, Andong National University and KRIVET, ISBN: 979-11-339-4799-7, Feb 28, 2017 (written in Korean).
- (4) **Choi, J.W.**, Lu, Y., Wicker, R.B., “Ch. 4: Projection Microstereolithography as Micro-Additive Manufacturing Technology: Processes, Materials, and Applications,” *Additive Manufacturing: Innovations, Advances, and Applications* edited by T.S. Srivatsan, T.S. Sudarshan, Taylor & Francis (Philadelphia, PA, USA), Published in Sep 25, 2015.

PEER-REVIEWED JOURNAL PUBLICATIONS (*corresponding author)

Google Scholar: Citation 2387; h-index 26; (<https://scholar.google.com/citations?user=LrOoOUkAAAAJ&hl=en>)

- (1) Kamath, S.S., **Choi, J.W.***, “3D printing of synthetic rubber ink via direct ink write process,” Rubber World, under review.
- (2) Emon, M.O.F., Russel, A., Nardkarni, G., **Choi, J.W.***, “A Low-Cost Visual Grasp Aid for Neuropathy Patients Using Flexible 3D Printed Tactile Sensors,” *ASME Journal of Medical Devices*, Vol. 15, 034502-1, 2021.
- (3) Huang, R., Elassi, J., Kim, M., Jo, K.H., Lee, S.K., Morscher, G., **Choi, J.W.***, “Material extrusion and sintering of binder-coated zirconia: comprehensive characterizations,” *Additive Manufacturing*, Vol. 45, 102073, 2021.
- (4) Mummareddy, B., Negro, D., Bharambe, V., Oh, Y., Burden, E., Ahlfors, M., **Choi, J.W.**, Du Plessis, A., Adams, J., MacDonald, E., Pedro C. “Mechanical Properties of Material Jetted Zirconia Complex Geometries with Hot Isostatic Pressing,” *Advances in Industrial and Manufacturing Engineering*, Vol. 3, 100052, 2021.
- (5) Kim, M., **Choi, J.W.***, “Rubber ink formulations with high solid content for direct-ink write process,” *Additive Manufacturing*, Vol. 44, 102023, 2021.
- (6) Dilibal, S., Sahin, H., Danquah, O., Emon, M.O.F., **Choi, J.W.***, “Additively Manufactured Custom Soft Gripper with Embedded Soft Force Sensors for an Industrial Robot,” *International Journal of Precision Engineering and Manufacturing*, Vol. 22, pp. 709-718, 2021.
- (7) Kim, M., Philip, D.G., Emon, M.O.F., **Choi, J.W.***, “Effects of Hardness on the Sensitivity and Load Capacity of 3D Printed Sensors,” *International Journal of Precision and Manufacturing*, Vol. 22, pp. 483-494, 2021.
- (8) Lin, M., Vatani, M., **Choi, J.W.**, Dilibal, S., Engeberg, E., “Compliant Underwater Manipulator with Integrated Tactile Sensor for Nonlinear Force Feedback Control of an SMA Actuation System,” *Sensors and Actuators A: Physical*, Vol. 315, 112221, 2020.
- (9) Alamdari, A., Lee, J., Emon, M.O.F., Kim, M., Dhinojwala, A., **Choi, J.W.***, “Effect of Surface Energy Reducing Agents on Adhesion Force in Liquid Bridge Microstereolithography,” *Additive Manufacturing*, Vol. 36, 101522,

2020.

- (10) Alkadi, F., Lee, K.C., Bashiri, A.H. and **Choi, J.W.***, “Conformal Additive Manufacturing using a Direct-Print Process,” *Additive Manufacturing*, Vol. 32, 100975 (9 pages), 2020.
- (11) Emon, M.O.F., Lee, J., Choi, U.H., Kim, D.H., Lee, K.C., **Choi, J.W.***, “Characterization of a Soft Pressure Sensor on the basis of Ionic Liquid Concentration and Thickness of the Piezoresistive Layer,” *IEEE Sensors Journal*, Vol. 19, No. 15, pp. 6076-6084, 2019.
- (12) Emon, M.O.F., Alkadi, F., Philip, D., Kim, D.H., Lee, K.C., **Choi, J.W.***, “Multi-Material 3D Printing of a Soft Pressure Sensor,” *Additive Manufacturing*, Vol. 6, pp. 629-638, 2019.
- (13) Copploe, A., Vatani, M., **Choi, J.W.**, Tavana, H., “A three-dimensional model of human lung airway tree to study therapeutics delivery in the lungs” *Annals of Biomedical Engineering*, Vol. 47, No. 6, pp. 1435-1445., 2019.
- (14) Alkadi, F., Lee, J., Yeo, J.S., Hwang, S.H., **Choi, J.W.***, “3D Printing of Ground Tire Rubber Composites,” *International Journal of Precision Engineering and Manufacturing – Green Technology*, Vol. 6, No. 2, pp. 211-222, 2019.
- (15) Jain, T. Saylor, D., Piard, C., Liu, Q. , Patel, V., Kaushal, R., **Choi, J.W.**, Fisher, J., Isayeva, I., Joy, A., “Effect of dexamethasone on room temperature 3D printing, rheology, and degradation of a low modulus polyester for soft tissue engineering,” *ACS Biomaterials Science & Engineering*, Vol. 5, pp. 846-858, 2019.
- (16) Govindarajan, S.R., Jain, T., **Choi, J.W.**, Joy, A., Isayeva, I., Vorvolakos, K., “A hydrophilic coumarin-based polyester for ambient-temperature initiator-free 3D printing: Chemistry, rheology and interface formation,” *Polymer*, Vol. 152, pp. 9-17, 2018.
- (17) Copploe, A., Vatani, M., Amini, R., **Choi, J.W.**, Tavana, H., “Engineered Airway Models to Study Liquid Plug Splitting at Bifurcations: Effects of Orientation and Airway Size,” *ASME Journal of Biomechanical Engineering*, Vol. 140, No. 9, pp. 091012 (8 pages), 2018.
- (18) Jo, K.H., Lee, S.H., **Choi, J.W.***, “Liquid Bridge Stereolithography – A Proof of Concept,” *International Journal of Precision Engineering and Manufacturing*, Vol. 19, No. 8, pp. 1253 – 1259, 2018.
- (19) Vatani, M., Alkadi, F., **Choi, J.W.***, “Algorithm to Reduce Leading and Lagging in Conformal Direct-Print,” *ASME Journal of Manufacturing Science and Engineering*, Vol. 140, No. 10, 101014 (8 pages), 2018.
- (20) Lee, J., Lu, Y., Kashyap, S., Alamdari, A., Emon, M.O.F., **Choi, J.W.***, “Liquid Bridge Microstereolithography,” *Additive Manufacturing*, Vol. 21, pp. 76-83, 2018.
- (21) Lee, J.K., **Choi, J.W.**, Lee, K.C., Lee, S., “Development of a Direct-Printed Tactile Sensor for Slip Detection and Its Application to Gripper Control,” *International Journal of Control, Automation and Systems*, Vol. 16 (2), pp. 929-936, 2018.
- (22) Thyagaraj, S., Pahlavian, S.H., Loth, F., Vatani, M., **Choi, J.W.**, Tubbs, S., Giese, D., Kroger, J.-R., Bunck, A.C., Martin, B., “An MRI-Compatible Hydrodynamic Simulator of Cerebrospinal Fluid Motion in the Cervical Spine,” *IEEE Transactions on Biomedical Engineering*, Vol. 65, No. 7, pp. 1516-1523, 2018.
- (23) Lee, J., Kim, H.C., **Choi, J.W.**, and Lee, I.H., “A review on 3D printed smart devices for 4D printing,” *International Journal of Precision Engineering and Manufacturing – Green Technology*, Vol. 4, No. 3, pp. 373-

- 383, 2017.
- (24) Emon, M.O.F., **Choi, J.W.***, “Flexible piezoresistive sensors embedded in 3D printed tires,” *Sensors*, Vol. 17, No. 3, 656 (13 pages), 2017.
- (25) Vatani, M., **Choi, J.W.***, “Direct-print photopolymerization for 3D printing,” *Rapid Prototyping Journal*, Vol. 23, Issue 2, pp. 337-343, 2017.
- (26) Lee, J., Emon, M.O.F., Vatani, M., **Choi, J.W.***, “Effect of degree of crosslinking and polymerization of 3D printable polymer/ionic liquid composites on performance of stretchable piezoresistive sensors,” *Smart Materials and Structures*, Vol. 26, 035043 (8 pages), 2017.
- (27) Govindarajan, S.R., Xu, Y., Swanson, J.P., Jain, T., Lu, Y., **Choi, J.W.**, Joy, A., “A Solvent and Initiator Free, Low-Modulus, Degradable Polyester Platform with Modular Functionality for Ambient-Temperature 3D Printing,” *Macromolecules*, Vol. 49, No. 7: pp. 2479 – 2437, Mar 2016.
- (28) Vatani, Morteza, Vatani, Mohammad, **Choi, J.W.***, “Multi-layer stretchable pressure sensors using ionic liquids and carbon nanotubes,” *Applied Physics Letters*, Vol. 108, pp. 061908 (5 pages), Feb 2016.
- (29) Hasan, M.N., Vatani, M., Chandy, A., **Choi, J.W.***, “Experimental and Numerical Analysis of Filament Front Deformation for Direct-Print,” *ASME Journal of Manufacturing Science and Engineering*, Vol. 138, No. 1, pp. 011003 (12 pages), Feb 2016.
- (30) Lu, Y., Yun, H.Y., Vatani, M., Kim, H.C., **Choi, J.W.***, “Direct-Print/Cure as a Molded Interconnect Device (MID) Process for Fabrication of Automobile Cruise Controllers,” *Journal of Mechanical Science and Technology*, Vol. 29, No. 12, pp. 5377-5385, 2015.
- (31) Hasan, M.N., Chandy, A., **Choi, J.W.***, “Numerical Analysis of Droplet Impact and Consequent Deformation for Direct-Print,” *Engineering Applications of Computational Fluid Mechanics*, Vol. 9, No. 1, pp. 554-566, 2015.
- (32) Lu, Y., Mantha, S.N., Crowder, D.C., Chinchilla, S., Yun, Y.H., Wicker, R.B., **Choi, J.W.***, “Microstereolithography and Characterization of Poly(propylene fumarate)-based Drug-loaded Microneedle Arrays,” *Biofabrication*, Vol. 7, pp. 045001 (13 pages), (**Media released in IOP Publishing**), 2015.
- (33) Engeberg, E., Dilibal, S., Vatani, M., **Choi, J.W.**, Lavery, J., “Anthropomorphic Finger Antagonistically Actuated by SMA Plates,” *Bioinspiration & Biomimetics*, Vol. 10, pp. 056002 (15 pages), 2015.
- (34) Vatani, M., Engeberg, E.D., **Choi, J.W.***, “Conformal Direct-Print of Piezoresistive Polymer/Nanocomposites for Compliant Multi-layer Tactile Sensors,” *Additive Manufacturing*, Vol. 7, pp. 73-82, 2015.
- (35) Vatani, M., Lu, Y., Engeberg, E.D., **Choi, J.W.***, “Combined 3D Printing Technologies and Materials for Fabrication of Tactile Sensors,” *International Journal of Precision Engineering and Manufacturing*, Vol. 16, No. 7, pp. 1375-1383, 2015.
- (36) Vatani, M., Engeberg, E.D., **Choi, J.W.***, “Detection of the Position, Direction, and Speed of Sliding Contact with a Multi-layer Compliant Tactile Sensor Fabricated using Direct-Print Technology,” *Smart Materials and Structures*, Vol. 23, pp. 0905008 (11pp), 2014.
- (37) Lu, Y., Vatani, M., **Choi, J.W.***, “Direct-Write/Cure Conductive Polymer Nanocomposites for 3D Structural Electronics,” *Journal of Mechanical Science and Technology*, Vol. 27, No. 10, pp. 2929-2934, 2013.

- (38) Vatani, M., Engeberg, E.D., **Choi, J.W.***, “Force and Slip Detection with Direct-Write Compliant Tactile Sensors Using Multi-Walled Carbon Nanotube/Polymer Composites,” *Sensors and Actuators A – Physical*, Vol. 195, pp. 90-97 (**Featured in the ScienceDirect Top 25 List of Most Downloaded Article**), 2013.
- (39) Vatani, M., Lu, Y., Lee, K.S., Kim, H.C., **Choi, J.W.***, “Direct-write stretchable sensors using single-walled carbon nanotubes/polymer matrix,” *ASME Journal of Electronic Packaging*, Vol. 135, pp. 011009-1-5, 2013.
- (40) Wu, H., Hu, W., Hu, H-C., Lin, X-W., Zhu, G., **Choi, J.W.**, Chigrinov V., Lu, Y-Q. “Arbitrary photo-patterning in liquid crystal alignments using DMD based lithography system,” *Optics Express*, Vol. 20, Iss. 15, pp. 16684-16689, 2012.
- (41) **Choi, J.W.***, Quintana, R., Wicker, R., “Fabrication and characterization of embedded horizontal micro-channels using line-scan stereolithography,” *Rapid Prototyping Journal*, Vol. 17, Issue 5, pp. 351-361, 2011.
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- (55) **Choi, J.W.**, Hur, S.M., Lee, S.H., “Free-form Surface Generation from Measuring Points using Laser Scanner,” *International Journal of the Korean Society of Precision Engineering*, Vol. 3, No. 4, pp. 15-23, 2002.

PEER-REVIEWED CONFERENCE PAPERS (*corresponding author)

- (1) **Choi, J.W.***, Kamath, S.S., Almazrou, Y. and Kyu, T., Mechanoelectrical conversion in 3D printed polymer electrolyte composites, 21st International Conference on Control, Automation and Systems (ICCAS 2021), Oct. 12-15, 2021, Jeju, Korea.
- (2) Emon, M.O.F, **Choi, J.W.***, “A preliminary study on 3D printed smart insoles with stretchable piezoresistive sensors for plantar pressure monitoring,” Proceedings of the ASME 2017 International Manufacturing Engineering Congress and Exposition (IEMCE 2017), November 3-9, 2017, Tampa, FL, Paper No: IMECE2017-71817 (6 pages).
- (3) Lu, Y., Kashyap, S., Emon, M.O.F., Lee, J., **Choi, J.W.***, “Development and characterizations of liquid bridge based microstereolithography (LBMSL) system,” Proceeding of the Manufacturing Science and Engineering Conference (MSEC 2017), June 04-08, 2017, Los Angeles, Paper No. MSEC2017-2731, pp. V002T01A023 (6 pages).
- (4) Vatani, M., Lu, Y., Engeberg, E.D., **Choi, J.W.***, “Combined 3D Printing Technologies and Materials for Fabrication of Tactile Sensors,” International Symposium of Green Manufacturing and Applications, June 24 – 28, 2014, Busan, Korea (a proceeding was transferred to a journal article in IJPEM).
- (5) Hasan, M.N., Vatani, M., Lu, Y., Kim, H.C., **Choi, J.W.***, “Numerical and Experimental Analysis of Droplet Impact, Deformation and Formation of Droplet Train,” Nov. 13-21, 2013, San Diego, CA, Vol. 2A, Paper No.: IMECE2013-64801, pp. V02AT02A096 (6 pages).
- (6) Vatani, M., Engeberg, E.D., **Choi, J.W.***, “Hybrid Additive Manufacturing of 3D Compliant Tactile Sensors,” Nov. 13-21, 2013, San Diego, CA, Vol. 2A, Paper No.: IMECE2013-63064, pp. V02AT02A004 (6 pages).
- (7) Lu, Y., Vatani, M., Kim, H.C., Lee, R.C., **Choi, J.W.***, “Development of Direct Printing/Curing Process for 3D Structural Electronics,” Nov. 13-21, 2013, San Diego, CA, Vol. 2A, Paper No.: IMECE2013-63068, pp. V02AT02A005 (5 pages).
- (8) **Choi, J.W.***, Vatani, M., Engeberg, E.D., “Direct-Write of Multi-layer Tactile Sensors,” 13th International Conference on Control, Automation and Systems, Oct. 20-23, 2013, Gwangju, Korea, pp. 164-168.

- (9) Engeberg, E.D., Vatani, M., **Choi, J.W.***, “Detection of the Direction and Speed of Motion of Forces on the Surface of a Compliant Tactile Sensor,” 13th International Conference on Control, Automation and Systems, Oct. 20-23, 2013, Gwangju, Korea, pp. 158-163.
- (10) Lu, Y., Vatani, M., **Choi, J.W.***, “Direct-Write/Cure Conductive Polymer Nanocomposites for 3D Structural Electronics,” 5th International Conference on Manufacturing, Design and Tribology (ICMDT) 2013, Busan, S. Korea, p. 169, **Best Paper Award**.
- (11) Engeberg, E.D., Vatani, M., **Choi, J.W.**, “Direction of slip detection for a biomimetic tactile sensor,” 12th International Conference on Control, Automation and Systems (ICCAS), Oct. 17-21, 2012, Jeju island, Korea, pp. 1933-1937.
- (12) **Choi, J.W.**, Irwin, M.D., Wicker, R.B., “DMD-based 3D micro-manufacturing,” Proc. of SPIE, Photonics West, Jan. 23-28, 2010, San Francisco, CA, Vol. 7596, pp. 75960H-1~11.
- (13) **Choi, J.W.**, Park, I.B., Wicker, R.B., Lee, S.H., Kim, H.C., “Fabrication of Complex 3D Micro-Scale Scaffolds and Drug Delivery Devices using Dynamic Mask Projection Microstereolithography,” 19th Solid Freeform Fabrication Symposium, Aug. 4-6, 2008, Austin, TX, pp. 652-675.
- (14) **Choi, J.W.**, Quintana, R., Wicker, R.B., “Fabrication of embedded horizontal micro-channels using line-scan stereolithography,” 19th Solid Freeform Fabrication Symposium, Aug. 4-6, 2008, Austin, TX, pp. 632-651.
- (15) Ha, Y.M., **Choi, J.W.**, Lee, S.H., Kim, H.C., “Fabrication of 3D Micro-structure on Large Surface using Projection Type Micro-stereolithography,” Asian Symposium for Precision Engineering and Nanotechnology (ASPEN 2007), Nov. 6-9, 2007, Gwangju, S. Korea, pp. 492-495.
- (16) **Choi, J.W.**, Ha, Y.M., Choi, K.H., Lee, S.H., “Curing Characteristics of 3-Dimensional Microstructures using Dynamic Pattern Projection,” Proc. of SPIE, Optomechatronic Technologies, Dec. 5-7, 2005, Sapporo, Japan, Vol. 6050, pp. 605003-1~5.
- (17) **Choi, J.W.**, Ha, Y.M., Won, M.H., Choi, K.H., Lee, S.H., “Fabrication of 3-Dimensional Microstructures using Dynamic Image Projection,” Asian Symposium for Precision Engineering and Nanotechnology (ASPEN 2005), Nov. 12-14, 2005, Shenzhen, China, pp. 472-476.

CONFERENCE/WORKSHOP/WEBINAR PRESENTATIONS

- (1) Kamath, S.S., Choi, J.W., Additive manufacturing of rubber inks using direct-ink write process, ACS Rubber, Oct 4-7, 2021, Pittsburgh, PA (abstract/poster)
- (2) Choi, J.W. and Emon, M.O.F., A preliminary study on measuring normal and tangential force using stretchable polymeric sensors for smart insoles, Midwest American Society of Biomechanics Conference, Sep 16-18, 2021, Cleveland State University, Cleveland, Ohio (2-page abstract/oral presentation).
- (3) Dwyer, C., Garretto, J., Morrison, G., Choi, J.W., MacDonald, E., Cortes, P., The dynamic and sensing performance of 3D printed functionally graded elastomeric lattice structures, MS&T21: Materials Science & Technology, October 17-21, 2021, Columbus, Ohio (abstract/poster)
- (4) Huang, R., Choi, J.W., “Characterization and process improvement of extrusion-based ceramic additive

- manufacturing process,” 2020 ASME IMECE, Nov 16 – 19, Virtual Conference (abstract/poster)
- (5) Kim, M., Choi, J.W., “Additive manufacturing of liquid rubber for tire applications,” 2020 ASME IMECE, Nov 16 – 19, Virtual Conference (abstract/oral presentation – pre-recording)
 - (6) Kim, M., Choi, J.W., “Preliminary study on additive manufacturing of natural rubber,” International Elastomer Conference, ACS Rubber Division, Oct 21, 2020, Virtual Conference (abstract/oral presentation – pre-recording)
 - (7) Alkadi, F., Emon, M.O.F., Philip, D., Lee, K.C., Choi, J.W., “Conformal 3D Printing of a Soft Pressure Sensor,” ASME IMECE 2019, Salt Lake City, UT, November 11-14 2019 (abstract/oral presentation)
 - (8) Alkadi, F., Choi, J.W., “Conformal Additive Manufacturing Process,” International Symposium on Precision Engineering and Sustainable Manufacturing (PRESM2019), Da Nang, Vietnam, July 10 – 13, 2019 (abstract/oral presentation)
 - (9) Alamdari, A.B., Lee, J., Emon, M.O.F., Choi, J.W., “Effects of Surface Energy Reducing Agents on Adhesion Force in Liquid Bridge Microstereolithography,” ASME IMECE 2018, Pittsburgh, PA, November 15 2018 (abstract/poster presentation)
 - (10) Alkadi, F., Choi, J.W., “Conformal 3D Printing of Tire Tread using Ground Tire Rubber (GTR) Composites,” ASME IMECE 2018, Pittsburgh, PA, November 15 2018 (abstract/oral presentation).
 - (11) Choi, J.W., “Advances in Polymer Additive Manufacturing,” 2018 Future Medicine – Challenges Between ‘Human’ and ‘Humanoid’, Asan Medical Center, Nov 8, 2018, Seoul, Korea (invited talk).
 - (12) Choi, J.W., “Advances in Polymer Additive Manufacturing,” 2018 International 3D Printing Korea Expo, Sep. 7, Gumi, S. Korea (keynote talk).
 - (13) Choi, J.W., “3D Printing of Smart Materials for Tactile Sensors,” The 2017 Fall Meeting, The Polymer Society of Korea, Oct 11-13, Jeju, S. Korea (invited talk).
 - (14) Choi, J.W., “Multi-scale, Vat-free Photopolymerization,” NSF Workshop on Accelerating NSF Research in Additive Manufacturing toward Industrial Applications, Univ. of Pittsburgh, PA, August 17-18, 2017 (invited presentation).
 - (15) Emon, M.O.F., Choi, J.W., “Flexible and Stretchable Ionic Liquid Based Pressure Sensor Fabrication via Direct-Print Photopolymerization,” 28th International Solid Freeform Fabrication Symposium - An Additive Manufacturing Conference, Aug 7-9, 2017, Austin, TX (abstract/poster presentation)
 - (16) Choi, J.W., Emon, M.O.F., Alkadi, F., Lee, J., “3D Printing of stretchable tactile sensors and treads using recycled tire rubber for health monitoring of tires,” International Symposium on Green Manufacturing and Applications (ISGMA 2017), (abstract/oral presentation).
 - (17) Choi, J.W., “3D Printing and Additive Manufacturing at The University of Akron,” Global Technology Cooperation Forum, Sponsored by Korea Institute for Advancement of Technology (KIAT), 17-18 November 2016, COEX, Seoul, Korea (oral presentation, invited talk).
 - (18) Emon, M.O.F., Alkadi, F., Lee, J., Vatani, M., Choi, J.W., “3D printing of a skin-like tactile sensor using polymer composites with ionic liquids and carbon nanotubes,” ASME IMECE 2016, Phoenix, AZ, Nov 11-17 (abstract/oral presentation).

- (19) Lu, Y., Kashyap, S., Emon, M.O.F., Choi, J.W., “A liquid bridge based microstereolithography process,” ASME IMECE 2016, Phoenix, AZ, Nov 11-17 (abstract/poster presentation).
- (20) Emon, M.O.F., Alkadi, F., Vatani, M., Lee, J., Choi, J.W., “3D Printed Stretchable Tactile Sensors,” ACS Fall 2016, Philadelphia, PA, Aug 21-25 (abstract/oral presentation, invited talk).
- (21) Govindarajan, S., Jain, T., Choi, J.W., Joy, A., Isayeva, I., Vorvolakos, K., “Adhesion Changes due to Viscoelastic Transitions Play a Role in Extrusion-based 3D Printability of Low-Modulus Polymer Melts,” ACS Fall 2016, Philadelphia, PA, Aug 21-25 (abstract/oral presentation).
- (22) Jain, T., Govindarajan, S.R., Xu, Y., Swanson, J., Lu, Y., Choi, J.W., Isayeva, I., Joy, A., “A Low Modulus Multi-functional Polyester Platform for Room Temperature 3D Printing,” ACS Fall 2016, Philadelphia, PA, Aug 21-25 (abstract/oral presentation).
- (23) Choi, J.W., “Advances and Challenges in 3D Printing of Stretchable Tactile Sensors,” ISGMA 2016, June 21 – 25, Bali, Indonesia (abstract/oral presentation, invited talk).
- (24) Choi, J.W., Alkadi, F., Emon, M.O.F., Lee, J., Vatani, M., “Conformal Direct-Print Photopolymerization for Fabrication of Smart Structures,” International Symposium on Green Manufacturing and Applications (ISGMA 2016), June 21 – 25, Bali, Indonesia (abstract/oral presentation).
- (25) Choi, J.W., Emon, M.O.F., Alkadi, F., Lee, J., Vatani, M., “Stretchable Tactile Sensors using Ionic Liquids and Carbon Nanotubes,” ISGMA 2016, June 21 – 25, Bali, Indonesia (abstract/oral presentation).
- (26) Emon, M.O.F., Alkadi, F., Vatani, M., Choi, J.W., “Flexible and stretchable sensor fabrication via multi-material direct printing,” Akron Functional Material Center, 2016 Spring Meeting, The University of Akron.
- (27) Vatani, M., Lee, J., Lee, K., Lee, I.H., Kim, H.C., Choi, J.W., “3D Printing of Multi-Material Tactile Sensors for Robotic Hand Applications,” Rapid 2015, May 18 – 21, Long Beach, CA (abstract/oral presentation)
- (28) Vatani, M., Choi, J.W., “Multi-Technology, Multi-Material Direct-Print Photopolymerization for 3D Printed Sensors,” ASME IMECE 2014, Nov. 14 – 21, Montreal, Canada (abstract/oral presentation)
- (29) Lu, Y., Crowder, D.C., Chinchillia, S., Yun, Y.H., Choi, J.W., “Bio-Printing of Microneedles for Transdermal Drug Delivery,” ASME IMECE 2014, Nov. 14 – 21, Montreal, Canada (abstract/oral presentation)
- (30) Lu, Y., Crowder, D.C., Chinchillia, S., Yun, Y.H., Choi, J.W., “Multi-material Microstereolithography for Fabrication of Microneedles Encapsulating Drugs,” International Conference on Biofabrication 2014, Sep 28 – Oct 1, Pohang, S. Korea (abstract/oral presentation)
- (31) Vatani, M., Vatani, M., Engeberg, E.D., Choi, J.W., “3D Printing of Artificial Skin-like Tactile Sensors,” 25th Solid Free Form Fabrication Symposium, Aug. 4th – 6th, 2014, Austin, Texas (abstract/oral presentation)
- (32) Vatani, M., Lu, Y., Hasan, M.N., Jeong, K.U., Engeberg, E., Choi, J.W., “3D Printing Processes and Materials for Fabrication of Sensors and Actuators,” 25th Solid Free Form Fabrication Symposium, Aug. 4th – 6th, 2014, Austin, Texas (abstract/poster)
- (33) Vatani, M., Hasan, M.N., Choi, J.W., “Direct-Print/Cure Process for 3D Printed Compliant Tactile Sensors,” Rapid, Detroit, MI, June 11 2014 (abstract/selected oral presentation)
- (34) Lu, Y., Vatani, M., Engeberg, E., Jeong, K.U., Choi, J.W., “Additive Manufacturing Research on Sensors and

- Actuators at The University of Akron,” PPS30, Cleveland, OH, June 9, 2014 (abstract/poster presentation)
- (35) Choi, J.W., Jeong, K.U., Engeberg, E.D., Vatani, M., Lu, Y., “3D Printed Sensors and Actuators,” MFG4, Hartford, CT, May 7 2014 (abstract/selected oral presentation)
- (36) Thyagaraj, S., Pahlavian, S.H., Vatani, M., Choi, J.W., Goodin, M., Bunck, A., Yiallourou, T., Loth, F., Martin, B.A., “3D Printed Model for Simulation of Cerebrospinal Fluid Motion in the Cervical Spinal Subarachnoid Space,” 2014 Midwest American Society of Biomechanics Meeting, The University of Akron (abstract).
- (37) Vatani, M., Engeberg, E.D., Choi, J.W., “Fabrication of Multi-Material, Multi-Layer Tactile Sensors Using Additive Manufacturing and Direct-Write,” Aug. 12-14 2013, Austin, TX (abstract/oral presentation)
- (38) Vatani, M., Lu, Y., Engeberg, E.D., Choi, J.W., “Fabrication and Characterization of 3D Printed Compliant Tactile Sensors,” Jun. 10-13 2013, Pittsburgh, PA (abstract/oral presentation).
- (39) Vatani, M., Engeberg, E.D., Choi, J.W., “Fabrication and Evaluation of Compliant Tactile Sensors,” ASME Manufacturing Science and Engineering Conference, Jun. 10-14 2013, Madison, WI (abstract/poster).
- (40) Lu, Y., Vatani, M., Choi, J.W., “Fabrication of 3D structural electronics using microstereolithography and direct-write,” 23th Solid Freeform Fabrication Symposium, Aug. 6-8 2012, Austin, TX (abstract/poster)
- (41) Choi, J.W., Vatani, M., Lu, Y., Wicker, R., “Hybrid Micro-Scale Additive Manufacturing for 3D Structural Electronics,” RAPID 2012, May 24 2012, Atlanta, GA.(abstract/oral presentation)
- (42) Choi, J.W., “Structural Electronics as Future Printed Electronics Products,” 1st International Conference, March 13 2012, Seoul, S. Korea. (abstract, plenary talk)
- (43) Choi, J.W., Wicker, R. “Combined Additive Micro-manufacturing and Direct Writing of 3D Structural Electronics,” KoPERA Annual Workshop (Printable Materials, Printing Technologies and Standardization for Korea/US HiddenChampion), Sep 26-27 2011, ETRI, Daejeon, S. Korea. (abstract, invited talk)
- (44) Choi, J.W., Rivera, A., Kim, H.C., Irwin, M.D., Wicker, R.B. “Multiple material stereolithography with enhanced manufacturing capabilities,” 21th Solid Freeform Fabrication Symposium, Aug. 9-12 2010, Austin, TX. (abstract/poster)
- (45) Choi, J.W., Mann, B., MacDonald, E., Wicker, R. “Fabrication of multi-material, multi-lumen, poly (ethylene glycol)-based nerve guidance conduits using microstereolithography,” TERMIS World Congress 2009, Aug. 31 – Sep. 3 2009, Seoul, S. Korea. (abstract/oral presentation)
- (46) Choi, J.W., MacDonald, E., Wicker, R. “Multiple material microstereolithography,” 20th Solid Freeform Fabrication Symposium, Aug. 4-6 2009, Austin, TX, pp. 781-792 (abstract/oral presentation).
- (47) Choi, J.W., Yamashita, M., Sakakibara, J., Kaji, Y., Oshika, T., Wicker, R. “Functional micro/macro fabrication combining multiple additive fabrication technologies: design and development of an improved micro-vane phacoemulsifier used in cataract surgery,” 20th Solid Freeform Fabrication Symposium, Aug. 4-6 2009, Austin, TX, pp. 553-568. (invited plenary talk)
- (48) Choi, J.W., Kim, H.C., MacDonald, E., Wicker, R. “Functional multiple material line-scan stereolithography technology,” 20th Solid Freeform Fabrication Symposium, Aug. 4-6 2009, Austin, TX. (abstract/poster).
- (49) Choi, J.W., Lee, S.H., Choi, K.H., Jung, I., Ha, C.S., Wicker, R.B. “3D PPF micro-scaffold fabrication using

- DMD-based maskless projection microstereolithography,” BIOMEDICAL ENGINEERING Recent Developments, Southern Biomedical Engineering Conference (SBEC 2008), April 18-20 2008, The University of Texas at El Paso (UTEP), El Paso, TX, pp. 205-206 (abstract/oral presentation).
- (50) Choi, J.W., Park, I.B., Kim, H.C., Lee, S.H. “Fabrication of High-aspect ratio Microneedles using Microstereolithography Process,” 7th International Workshop on High-Aspect-Ratio Micro-Structure Technology (HARMST 07), Jun. 6-8 2007, Besançon, France, pp. 213-215 (abstract/poster).
- (51) Choi, J.W., Park, I.B., Ha, Y.M., Jung, M.G., Lee, S.D., Lee, S.H. “Insertion Force Estimation of Various Microneedle Array-type Structures Fabricated by a Microstereolithography Apparatus,” SICE-ICASE International Joint Conference, Oct. 18-21 2006, Busan, Korea, pp. 3678-3681 (oral presentation).
- (52) Choi, K.H., Choi, J.W., Kim, H.C., Doh, Y.H., Kim, D.S., Lee, S.H. “Study on Path Generation and Control based on Dual Laser in Solid Freeform Fabrication System,” SICE-ICASE International Joint Conference, Oct. 18-21 2006, Busan, Korea, pp. 3682-3687 (oral presentation).
- (53) Choi, K.H., Choi, J.W., Doh, Y.H., Kim, D.S., Lee, S.H. “Generation of Laser Scanning Path and Scanning Control for the Fabrication of Large Size Shape,” International Conference on flexible Automation and Intelligent Manufacturing (FAIM 2005), Jul. 18-20 2005, Bilbao, Spain, pp. 112-118 (oral presentation).
- (54) Choi, K.H., Choi, J.W., Doh, Y.H., Kim, D.S. “Laser Scanning Path Generation for Fabrication of Large Size Shape,” International Conference on Control, Automation, and System (ICCAS 2005), Jun. 2-5 2005, KINTEX, Gyeonggi-do, Korea, pp. 2175-2178 (oral presentation).
- (55) Choi, J.W., Ha, Y.M., Kim, H.S., Won, M.H., Choi, K.H., Lee, S.H. “An Implementation of RP-based Micro Fabrication Apparatus for Micro Structures,” High Aspect Ratio Micro Structure Technology Workshop (HARMST 05), Jun. 10-13 2005, Gyeongju, Korea, pp. 190-191 (poster).

INVITED SEMINARS/WEBINARS

- (1) Future Tires Enabled by Additive Manufacturing of Rubber and Sensors, June 23, 2021, USPTO Tech Fair
- (2) Conformal Additive Manufacturing of Soft Pressure Sensors, Jan 15, 2021, Additive Manufacturing Webinar, Polymer Processing Society (PPS)
- (3) The Present and Future of 3D Printing Technology / Conformal Additive Manufacturing and Liquid-Bridge Microstereolithography, May 22, 2019, Department of Organic Material Science and Engineering, Pusan National University, Busan, Korea
- (4) Conformal Additive Manufacturing and Liquid-Bridge Microstereolithography, April 10, 2019, Youngstown State University, Youngstown, Ohio
- (5) Advances in Polymer Additive Manufacturing, March 26, 2019, Korea Research Institute of Chemical Technology (KRICT), Daejeon, Korea
- (6) Advances in Polymer Additive Manufacturing, March 7, 2019, Dr. Amis’s class, College of Polymer Science and Engineering, UA
- (7) Advances in Polymer Additive Manufacturing, Dec 11, 2018, Dept of Carbon and Nano-Component Engineering,

Jeonju University, Jeonju, Korea

- (8) Advances in Polymer Additive Manufacturing, Dec 10, 2018, Dept of Polymer Engineering, Pukyong National University, Busan, Korea
- (9) Conformal Additive Manufacturing for Tire Applications, Dec 7, 2018, Hankook Tire, Daejeon, Korea
- (10) Conformal Additive Manufacturing for Smart Structures, Dec 6, 2018, Global Cooperation: The First Track to Smart Future, Ministry of Trade, Industry and Energy, Seoul, Korea
- (11) Advances in Polymer Additive Manufacturing, Dec 4, 2018, Donggeui University, Busan, Korea
- (12) Advances in Polymer Additive Manufacturing, Nov 21, 2018, BK21, Pusan National University, Busan, Korea
- (13) The Present and Future of 3D Printing Technology, Nov 12 – 13, 2018, Busan University of Foreign Studies, Busan, Korea
- (14) The Present and Future of 3D Printing Technology, Nov. 8, 2018, Dongdeok Women's University, Seoul, Korea
- (15) Advances in Polymer Additive Manufacturing, Nov. 7, 2018, Hanyang University, Seoul, Korea
- (16) Advances in Polymer Additive Manufacturing, Nov. 7, 2018, Seoul National University of Science and Technology, Seoul, Korea
- (17) The Present and Future of 3D Printing Technology, Oct 31, 2018, Moongyoung Women's High School, Moongyoung, Korea
- (18) Advances in Polymer Additive Manufacturing, Oct 30, 2018, Inha University, Incheon, Korea
- (19) Conformal Additive Manufacturing and Liquid Bridge Microstereolithography, Oct 24, 2018, Chosun University, Gwangju, Korea
- (20) New processes and Materials on Additive Manufacturing, Oct 19, 2018, Pusan National University, Busan, Korea
- (21) Conformal Additive Manufacturing and Its Applications, Oct 12, 2018, Korea Institute of Materials Science (KIMS), Changwon, Korea
- (22) Additive Manufacturing of Smart Structures, Oct 16, 2017, Shanghai Industrial Technology Institute (SITI), Shanghai, China.
- (23) Additive Manufacturing of Smart Structures, Oct 11, 2017, Chosun University, Gwangju, Korea.
- (24) Advances in 3D Printing of Smart Structures, July 25 2017, Inha University, Incheon, Korea.
- (25) Advances in Additive Manufacturing: From Polymer to Metal, July 10, 2017, KITECH – Daegyeong Regional Division, Korea.
- (26) Advances in Additive Manufacturing: From Polymer to Metal, July 11, 2017, DeaguTek, Daegu, Korea.
- (27) Advances in 3D Printing: 3D Printing of Smart Structures; 3D Micro-Printing and Its Applications, July 5, 2017, Ulsan National Institute of Science and Technology (UNIST), Ulsan, Korea.
- (28) 3D Micro-Printing and Its Applications, June 15, 2017, Jeonbuk National University, Jeonbuk, Korea.
- (29) Advances in 3D Printing of Smart Structures; Introduction to UA 3+2 Engineering Program, June 8, 2017, Dankook University, Yong-in, Korea.
- (30) 3D Printing of Smart Structures: Advances and Challenges, January 18 2017, Joint Meeting of ASM Akron International and ASME Akron.

- (31) Multi-Scale 3D Printing of Microneedle Arrays for Early-Stage Melanoma Therapy, April 11 2016, FRC Summer Fellowships Seminar at UA.
- (32) 3D Printing with 3D4E on Prosthetics, Jan 28 2016, 1st meeting of 3D4E at UA.
- (33) Additive Manufacturing Capabilities at The University of Akron, Dec 16 2015, AP Systems, Inc., Dongtan, Korea.
- (34) The Future of 3D Printing, Dec 9 2015, Korea Institute of Materials Science, Changwon, Korea.
- (35) The Future of 3D Printing, Dec 9 2015, Changwong National University, Changwon, Korea.
- (36) The Future of 3D Printing: From Technologies to Business Cases, Oct 20 2015, Hudson Library & Historical Society, Hudson, OH.
- (37) 3D Printing of Smart Structures, April 2 2015, Ocean Engineering, Florida Atlantic University, Diana Beach, FL.
- (38) 3D Printed Tactile Sensors for Robotic and Prosthetic Applications, April 1 2015, Mechanical and Civil Engineering Departments, Florida Atlantic University, Boca Raton, FL.
- (39) 3D Printing Technologies for Architecture and Architectural Engineering, Dec 22 2014, Tongmyong University, Korea.
- (40) 3D Printing and Additive Manufacturing: State of the Art and Research Trends, August 5 2014, Gyeongnam TECHNOPARK, Korea.
- (41) Advancing 3D Printing Technologies toward Smart Structures, August 4 2014, Chonbuk National University, Korea.
- (42) Advancing 3D Printing Technologies toward Smart Structures, July 26 2014, Jeju National University, Korea.
- (43) 3D Printing Technologies: State of the Art in Unites States, July 22 2014, Gumi Mini Cluster, Korea.
- (44) 3D Printing Technologies: From Microstructures to Active Components, July 7 2014, KITECH – Daegyeong Regional Division, Korea.
- (45) 3D Printing Technologies and Materials for Sensors, Actuators, and Electronics, June 30 2014, Yeongnam University, Korea.
- (46) 3D Printed Sensors and Electronics, July 29 2013, JEIOS, Korea.
- (47) Additive Manufacturing – State of the art and National Additive Manufacturing Innovation Institute (NAMII), July 29 2013, POSCO Songdo Product Application Research Center, Korea.
- (48) University of Akron Capabilities for National Additive Manufacturing Innovation Institute (NAMII), July 10 2013, POSTECH, Korea.
- (49) Additive Manufacturing – University of Akron Capabilities for National Additive Manufacturing Innovation Institute in USA, May 30 2013, School of Electrical Engineering, Soongsil University, Korea.
- (50) Additive Manufacturing Capabilities at The University of Akron – Energy Savings and National Additive Manufacturing Innovation Institute in USA, May 28 2013, Energy-Related Workforce Development Institute at Andong National University, Kyungbuk, Korea.
- (51) 3D Printing and its Application, May 15 2013, Firestone High School, Akron, Ohio.
- (52) Microstereolithography and its Applications, May 16 2012, Department of Mechanical and Automotive Engineering, Andong National University, Kyungbuk, Korea.

- (53) Advanced Additive Manufacturing and Applications, May 15 2012, Division of Mechanical & Automotive Engineering, Wonkwang University, Iksan, Korea.
- (54) Functional Micro/Macro Additive Manufacturing, Dec 12 2011, Department of Mechanical Systems Engineering, Jeju National University, Jeju, Korea.
- (55) Advanced Additive Manufacturing for Biomedical Applications, Oct 7 2011, Department of Biomedical Engineering, The University of Akron, Akron, OH.
- (56) Advanced Additive Manufacturing and its Applications, June 8 2011, Education Center for Green Industry-friendly Fusion Technology (GIFT), Pusan National University (PNU), Busan, Korea.
- (57) Functional Micro/Macro Additive Manufacturing, June 7 2011, School of Mechanical Engineering, Yeungnam University, Gyoungbuk, Korea.
- (58) Functional Micro/Macro Additive Manufacturing Research and Technology Development within the W.M. Keck Center for 3D Innovation at the University of Texas at El Paso, USA, Sep. 3 2009, Korea Institute of Machinery and Materials (KIMM), Daejeon, Korea.

GRADUATE FACULTY ACTIVITIES

- (1) Rui Huang, Ph.D., Committee chair, Mechanical Engineering, UA, present
- (2) Leyao Wu, Ph.D., External committee member, Polymer Science and Polymer Engineering, UA, present
- (3) Erin Farrell, Ph.D., External committee member, Polymer Science and Polymer Engineering, UA, Aug 2021
- (4) Dian Jian, Ph.D., Committee member, Mechanical Engineering, UA, May 2021
- (5) Sulochana Shrestha, Ph.D., Committee member, Mechanical Engineering, UA, May 2021
- (6) Phil-Jae Joo, Ph.D., External committee member, Polymer Engineering, UA, Dec 2020
- (7) Bangan Peng, Ph.D., External committee member, Polymer Science, UA, Dec 2020
- (8) Daryl Philip, M.S., Committee chair, Mechanical Engineering, UA, Aug 2020
- (9) Md. Omar Faruk Emon, Ph.D., Committee chair, Mechanical Engineering, UA, Aug 2020
- (10) Aslan Alamdari, M.S., Committee chair, Mechanical Engineering, UA, Dec 2019
- (11) Faez Alkadi, Ph.D., Committee chair, Mechanical Engineering, UA, May 2019
- (12) Seied Zaniar Hoseini, Ph.D., Committee member, Electrical Engineering, UA, May 2018
- (13) Hari Poudyal, M.S., Committee member, Mechanical Engineering, May 2018
- (14) Antonio Copploe, M.S., Committee member, Biomedical Engineering, Aug 2017
- (15) Xiaoliang Zhu, Ph.D., Committee member, Mechanical Engineering, UA, Aug 2016
- (16) S. Raj Govindarajan, Ph.D., External committee member, Polymer Science, UA, May 2016
- (17) Yanfeng Lu, Ph.D., Committee chair, Mechanical Engineering, UA, Aug 2016
- (18) Pashupati Dhakal, M.S., Committee member, Mechanical Engineering, UA, May 2016
- (19) Zachary Ray, M.S., Committee member, Mechanical Engineering, UA, April 2016
- (20) Suraj Thyagaraj, Ph.D., Committee member, Mechanical Engineering, UA, April 2016
- (21) Morteza Vatani, Ph.D., Committee chair, Mechanical Engineering, UA, May 2015

- (22) Noman Muhammad Hasan, M.S., Committee chair, Mechanical Engineering, UA, Aug 2014
- (23) Nymisha Satya Mantha, M.S., Committee chair, Mechanical Engineering, UA, Aug 2013
- (24) Setareh Niknezhad, Ph.D., External committee member, Polymer Engineering, UA, Dec 2012
- (25) Du Li, Ph.D., Committee member, Mechanical Engineering, UA, Nov 2012
- (26) Zhuochen Wang, M.S., Committee member, Mechanical Engineering, UA, April 2012
- (27) Yinko Grajeda, M.S., Committee member, Mechanical Engineering, UTEP, 2010

STUDENTS/POST-DOC ADVISING

- **Postdoctoral Scholars**

- (1) Dr. Morteza Vatani, Ph.D.: Sep – Nov 2015; now in Keracel Inc., Santa Clara, CA as a senior engineer
- (2) Dr. Jeongwoo Lee, Ph.D.: Feb 2016 – April 2018; now Hankook Tire – America Technical Center (ATC), Akron, OH

- **Doctor of Philosophy**

- (1) Morteza Vatani, Ph.D.: joined in Sep 2011, graduated in Aug 2015, 2014 Dean's Fellowship Award (Thesis title: Additive manufacturing of stretchable tactile sensors: processes, materials, and applications)
- (2) Yanfeng Lu, Ph.D.: joined in Sep 2011, graduated in Aug 2016, now at Evonik, IN as an Additive Manufacturing Engineer (Thesis title: A study on liquid bridge based microstereolithography (LBMSL) system)
- (3) Faez Alkadi, Ph.D.: joined in Aug 2014, graduated in May 2019 and now at Jazan University in Saudi Arabia as an assistant professor (Thesis title: Development of a conformal additive manufacturing process and its application)
- (4) Md Omar Faruk Emon, Ph.D.: joined in Jan 2015, graduated in Aug 2020 and now at University of New Haven as an assistant professor (Thesis title: Ionic liquid-based 3D printed soft pressure sensors and their applications)
- (5) *Rui Huang, M.S.: joined in Jan 2018 (topic: 3D printing of ceramic materials)*
- (6) *Ahadur Rahim, B.S.: joined in Jan 2019 (topic: Continuous LBMSL)*
- (7) *Mazen Kiki, M.S.: joined in Aug 2020 (topic: 3D Printed Sensors for Tire Applications)*
- (8) *Bahareh Tabatabaei, B.S.: joined in Jan 2021 (topic: TBD)*
- (9) *Sarath Kamath, B.S.: joined in Jan 2021 (topic: TBD)*
- (10) *Md. Jarir Hossain, B.S.: joined in Jan 2021 (topic: TBD)*
- (11) *Bipendra Basnet, B.S.: joined in Jan 2021 (topic: TBD)*
- (12) *Bharath Reddy Alandur Ramesh, M.S.: joined in Jan 2021 (topic: TBD)*

- **Master of Science**

- (1) Nymisha Satya Mantha, M.S.: joined in Sep 2011, graduated in Aug 2013 (Thesis title: Fabrication of PPF based drug containing microneedle array by microstereolithography)
- (2) Noman Muhammad Hasan, M.S.: joined in Jan 2012, graduated in Aug 2014, Ph.D. in CWRU, now at

- Goodyear (Thesis title: Numerical analysis of droplet and filament deformation for printing process)
- (3) Aslan Alamdari, B.S.: joined in Aug 2017, graduated in Dec 2019, now a Ph.D. student at Ohio State Univ. (Thesis title: Reducing adhesion force in liquid bridge microstereolithography)
 - (4) Daryl Philip, B.S.: joined in Jan 2018, graduated in Aug 2020 (Thesis title: Effects of hardness of 3D printed sensors on sensitivity and load capacity)
 - (5) Myoeum Kim, M.S, joined in Jan 2019, graduated in May 2021 (Thesis title: Additive manufacturing of rubber ink formulations with high solid content)
 - (6) Sumanth Kashyap, B.S: joined in Aug 2015 (topic: vat-free photopolymerization); dropped
 - (7) Byungchul Yang, M.S. joined in Jan 2020 (topic: Electroplating of 3D printed devices); dropped
- **M.S. (Non-Thesis)**
 - (1) Shane D. Hague from Bridgestone: completed in Spring 2015 (Report title: 3D Printing in the Tire Industry)
 - (2) Doug Costlow from Bridgestone: completed in Spring 2017 (Report title: Processing Rubber with Additive Manufacturing)
 - (3) Tamira Ford from Timken: completed in Fall 2019 (Report title: Synthesis and Characterization of Zeolite Adsorbents for Application in Fuel Vapor Recovery Systems)
 - **Undergraduate**
 - (1) Kristin Wright: joined in Spring 2013, graduated in winter 2013, Senior design project of “Low-cost Additive Manufacturing for Educational Purposes”
 - (2) Hall Miles: joined in Spring 2015, development of low-cost 3D printers
 - (3) Andrea Felicelli: joined in Fall 2015, development of low-cost 3D printers for sensors; NSF REU support (2016) for the development of low-cost 3D printers for microstructuring
 - (4) Riniah Foor: joined in Aug 2016, development of low-cost 3D printers for sensors
 - **High/Middle School Students**
 - (1) Allison Carpenter from National Inventors Hall of Fame STEP High School; worked on low-cost 3D printing for tactile sensor applications (Summer 2016)
 - (2) Daniel Hebert from Firestone High School; worked on low-cost 3D printing for tactile sensor applications (Summer 2016)
 - **Visiting Students**
 - (1) Hyung-Ju Ko; Sang-Sik Oh from Andong National University in Korea: MID research during Aug 9 – 30, 2013.
 - (2) Sang-Gu Woo; Seong-Taek Oh from Chungbuk National University in Korea: Sensor research during Aug 9 – 30, 2013.
 - (3) Dae-Hak Lee; Jin-Hyuk Moon from Chonbuk National University in Korea: Rubber conductor research during Jan 2 – Feb 25 2014.
 - (4) Jong-Hwan Lee from Chonbuk National University in Korea: Flexible sensor research during Jan 2 – 28 2015.