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EMPLOYMENT

08/2021 – Present **Associate Professor**, Department of Chemical Engineering, UMass-Amherst, MA
09/2014 – 07/2021 **Assistant Professor**, Department of Chemical Engineering, UMass-Amherst, MA
10/2009 – 08/2014 **Postdoctoral Research Associate**, Center for Engineering in Medicine, Massachusetts

EDUCATION

06/2005 – 08/2009 **Ph.D. Biomedical Engineering**, University of Michigan, Ann Arbor, MI
09/2003 – 05/2005 **M.S. Biomedical Engineering**, University of Michigan, Ann Arbor, MI
03/1997 – 02/2003 **B.E. Chemical and Biological Engineering**, Korea University, Seoul, Republic of Korea
Summa cum laude (26 months mandatory military service during 12/1997-02/2000)

AWARDS AND HONORS

03/2020 **Junior Faculty Award**, College of Engineering, UMass-Amherst
02/2020 **Faculty Early Career Development Program Award**, National Science Foundation
01/2020 **Early Career Investigator Award**, METAvivor Foundation
11/2019 **KICHe President Young Investigator Award**
06/2017 Invitation & Pilot Grant Award, Interdisciplinary Approaches to Cancer Metastasis Workshop NCI
08/2015 Invited Keynote Speaker in the Biomaterials Session, US-Korea Conference, Atlanta, GA
07/2013 Scholarship for the Short Course on Experimental Models on Human Cancer, Jackson Laboratory
08/2012 **Pathway to Independence Award (NIH K99/R00)**, National Cancer Institution
03/2011 Scholarship and Podium Talk Invitation, Keystone Symposium, "Implantable Humanized Stem Cell Niches"
12/2010 Selection of Cell Biology 2010 (top 12 over 1,000), Annual meeting ASCB, Philadelphia, PA
"Transplantable Bone Marrow Analogues to Enhance Recovery of Bone Marrow Failure"
07/2010 **Postdoctoral Research Fellowship**, Shriners Hospital for Children, Boston, MA
02/2010 Poster of Distinction award (top 5 over 200), Annual MGH Research Symposium, Boston, MA
11/2009 Nominated Distinguished Dissertation Award, Biomedical Eng. Dept., Univ. of Michigan
02/2009 **Distinguished Achievement Award**, College of Engineering, Univ. of Michigan
11/2008 1st Place in Oral Presentation, Engineering Graduate Symposium, Univ. of Michigan
09/2008 **Rackham Predoctoral Fellowship**, Graduate School, Univ. of Michigan
07/2006 ASCB Travel Grant Award, Stem Cell Niches Summer Meeting, Boston Univ.
08/2003 **Korean Science & Engineering Foundation Fellowship**, Korean Government
12/2002 A gold prize in undergraduate thesis contest, Chemical Eng. Dept. Korea Univ.
09/2000 Merit-based Scholarship (4 times), Dean's List (5 times), Korea Univ.

AFFILIATIONS AND OTHER APPOINTMENTS

12/2018 – Present Affiliated Faculty Member, NIH-Biotech Training Program, UMass-Amherst
09/2016 – Present Adjunct Faculty, Department of Biomedical Engineering, UMass-Amherst
09/2015 – Present Affiliated Faculty Member, Molecular & Cellular Biology Program, UMass-Amherst
09/2014 – Present Principle Investigator, Institute for Applied Life Sciences, UMass-Amherst

PEER-REVIEWED PUBLICATIONS

Graduate^([G]) and undergraduate^([UG]) student authors advised by Lee are underlined and denoted accordingly. Authors that contributed equally are designated with a †. The corresponding author is designated with a *.



From google scholar: **Total citation: 4466 (6/2022)**

From UMass-Amherst

- Sharma A.^[G], Raman V., **Lee J.**, Forbes N. "Microbial imbalance induces inflammation by promoting salmonella penetration through the mucus barrier" **ACS Infectious Disease** (2022) 8(5): 969-981.
- Shafiee S., Gelebart P., Popa M., Hellesøy M., Hovland R., Brendsdal R., **Lee J.**, Tohyama K., Molven A., Parekkadan B., Gjertsen B., Kittang A., McCormack E. "Preclinical characterization and development of a novel myelodysplastic syndrome-derived cell line" **British Journal of Hematology** (2021) 193(2): 415.
- Park Y.^[G], Cheong, E.^[UG], Kwak, J-K.^[G], Carpenter, R.^[G], Shim, J-H., **Lee, J.*** "Trabecular bone organoid model for studying the regulation of localized bone remodeling" **Science Advances** (2021) 7(4) eabd6495.
- Yu, S-K. Kim, M-K., Park, Y-I, Bae, M., Kang, H., Hu, S., Pham, T., Carpenter, R.^[G], **Lee, J.**, Lee, O-H., Lee, J-Y., Kim, Y-C. "Anthocyanin-rich aronia berry extract mitigates high-fat and high-sucrose diet-induced adipose tissue inflammation by inhibiting NF-κB activation" **Journal of Medical Food** (2020)
- Sharma, A.^[G], Raman, V., **Lee, J.**, Forbes, NS* "Mucus blocks probiotics but increases penetration of motile pathogens and induces TNF-α and IL-8 secretion" **Biotechnology and Bioengineering** (2020) 117: 2540-2555.
- Carpenter, R.^[G], Macres, D.^[UG], Kwak, J-K.^[G], Daniel, K.^[UG], **Lee, J.*** "Fabrication of bioactive inverted colloidal crystal scaffolds using expanded polystyrene beads" **Tissue Engineering Part C: Methods** (2020) 26 (3), 143-155. **(Cover article)**
- Sharma, A.^[G], Kwak, J-K.^[G], Kolewe, K., Schiffman, J., Forbes, N.S.* , **Lee, J.*** "In vitro reconstitution of an intestinal mucus layer shows that cations and pH control the pore structure that regulates its permeability and barrier function" **ACS Applied Biomaterials** (2020), 3 (5), 2897-2909.
- Kwak, J-K.^[G], **Lee, J.*** "Thermoresponsive inverted colloidal crystal hydrogel scaffolds for lymphoid tissue engineering" **Advanced Healthcare Materials** (2020), 1901556. **(Cover article)**
Highlight in Advanced Sciences News
- Carpenter, R.^[G], Oh, H., Ham, I., Kim, D., Hur, H., **Lee, J.*** "Scaffold-assisted ectopic engraftment of internal organs and patient-derived tumors" **ACS Biomaterials Science & Engineering** (2019) 5(12): 6667-6678. **(Cover article)**
News in UMass-Amherst News
- Carpenter, R.^[G], Kwak, J-K^[UG], Peyton, S.R., **Lee, J.*** "Implantable pre-metastatic niches for the study of the micro-environmental regulation of disseminated human tumor cells" **Nature Biomedical Engineering** (2018) 2 (12), 915-929. Editor's Choice: Science Translational Medicine "Charting the course of metastatic cells"
Highlighted in Nature Biomedical Engineering "Engineered niches model the onset of metastasis"
News in Boston Globe, News in UMass-Amherst
- Lee, J.***, Heckle, D., Parekkadan, B.* "Multiple genetically engineered humanized microenvironments in a single mouse" **Biomaterials Research** (2016) 20:19. **(*Co-corresponding author)**
Research Highlight: BioMed Central Blog, News in UMass-Amherst
- Lee, J.***, Kohl, K., Shanbhag, S., Parekkadan, B.* "Scaffold-integrated microchips for end-to-end in vitro tumor isolation and xenograft formation" **TECHNOLOGY** (2015) 3(4): 179. **(*Co-corresponding author)**
Research Highlight ScienceDaily
- Lee, J.#**, Bersani, F#, Yu, M., Morris, R., Desai, R., Ramaswamy, S., Toner, M., Haber, D.A.*, Parekkadan, B.* "Bioengineered Implantable Scaffolds as a Tool to Study Stromal-Derived Factors in Metastatic Cancer Models" **Cancer Research** (2014) 15;74(24):7229-7238.
Editor's Choice in Science Translational Medicine
- Shen, K., **Lee, J.**, Yarmush, M., Parekkadan, B.* "Microcavity Substrates Cased from Self-Assembled Microsphere Monolayers for Spheroid Cell Culture" **Biomed Microdevices** (2014) 16(4): 609-615.
- Bohr, B., Patel, S.J., Vasko, R., Shen, K., Iracheta-Vellve, A., **Lee, J.**, Sundhar-Bale, S., Chakraborty, N., Brines, M., Cerami, A., Berthiaume, F.*, Yarmush, M.L.* "Modulation of Cellular Stress Response via the erythropoietin/CD131

- Heteroreceptor Complex in Mouse Mesenchymal-Derived Cells" **Journal of Molecular Medicine** (2014) 93(2): 199-210.
16. Milwid, J.M., Elman, J., Li, M., Shen, K., Manrai, A., Gabow, A., Yarmush, J., Jiao, Y., Fletcher, A., **Lee, J.**, Cima, M., Yarmush, M., Parekkadan, B.* "Enriched Protein Screening of Human Bone Marrow Mesenchymal Stromal Cell Secretions Reveals MFAP5 and PENK as Novel IL-10 Modulators" **Molecular Therapy** (2013) 22(5): 999-1007.
 17. **Lee, J.**, Wang, J.B., Bersani, F., Parekkadan, B.* "Capture and Printing of Fixed Stromal Cell Membrane for Bioactive Display on PDMS Surfaces" **Langmuir** (2013) 29(34) 10611-10616.
 18. Usta, O.B., Kim, Y., Ozer, S., Bruinsma, B.G., **Lee, J.**, Demir, E., Berendsen, T.A., Puts, C. F., Izamis, M-L, Uygun, K., Uygun, B.E., Yarmush, M.L.* "Supercooling as a viable non-freezing cell preservation method of rat hepatocytes" **Plus One** (2013) 8(7) e69334.
 19. Milwid, J.M. Li, M., Jiao, J., **Lee, J.**, Yarmush, M.L., Parekkadan, B.* "Evidence of a Hematopoietic Origin of Human Bone Marrow Stromal Cells" **Journal of Bone Marrow Research** (2013) 1(113):2.
 20. Milwid, J.M., Ichimura, T., Li, M., Jiao, Y., **Lee, J.**, Yarmush, J., Parekkadan, B., Tilles, A., Bonventre, J.V., Yarmush, M.L.* "Secreted Factors From Bone Marrow Stromal Cells Upregulate IL-10 and Reverse Acute Kidney Injury" **Stem Cells International** (2012), Article ID 392050.
 21. **Lee, J.**, Li, M., Milwid, J.M., Dunham, J., Vinegoni, C., Gorbato, R., Iwamoto, Y., Wang, F., Shen, K., Hatfield, K., Enger, M., Shafiee, S., McCormack, E., Ebert, B., Weissleder, R. Yarmush, M.L., Parekkadan, B.* "Implantable Microenvironments to Attract Hematopoietic Stem/Cancer Cells" **Proceedings of the National Academic Sciences** (2012) 109(48) 19638-19643.
Research Highlights in Nature Methods
 22. Berendsen, T.A., Bruinsma, B.G., **Lee, J.**, D'Andrea, V., Lui, Q., Izamis, M-L, Uygun, K., Yarmush, M. L. "A simplified sub-normothermic machine perfusion model restores ischemically damaged liver grafts in a rat model of orthotopic liver transplantation" **Transplantation Research** (2012) 1:6
 23. Li, M., Tilles, A., Milwid, J.M., Hammad, M., **Lee, J.**, Yarmush, M. L., Parekkadan, B.* "Phenotypic and Functional Characterization of Human Mesenchymal Stromal Cells in Hollow Fiber Bioreactors" **Journal of Tissue Engineering and Regenerative Medicine** (2012) 6(5) 369-377.
 24. Jeong, S-H., **Lee, J.**, Ge, D., Sun, K., Nakashima, T., Yoo, S-I. Agarwal, A., Li, Y., Kotov, N. A. "Reversible Nanoparticle Gels with Color Switching" **Journal of Materials Chemistry** (2011) 31(21), 11639-11643.
 25. **Lee, J.**, Cuddihy, M. J., Cater, G., Kotov, N. A. "Engineering Liver Tissue Spheroids Using Inverted Colloidal Crystal Scaffolds" **Biomaterials** (2009) 30(27) 4687-4694.
 26. **Lee, J.**, Lilly, D.G., Doty, C.R., Podsiadlo, P., Kotov, N.A. "In vitro Toxicity Testing of Nanoparticles in Three-Dimensional Cell Culture" **Small** (2009) 5(10) 1213-1221.
Research Highlights in Nature Nanotechnology, Toxicology testing in the third dimension
 27. **Lee, J.**, Kotov, N.A. "Notch Ligand Presenting Acellular 3D Microenvironments for Ex Vivo Human Hematopoietic Stem Cell Culture Made by Layer-by-Layer Assembly" **Small** (2009) 5(9) 1008-1013. (Front Cover Article)
 28. Podsiadlo, P., Michel, M., Critchley, K., Srivastava, S., Qin, M., **Lee, J.**, Verploegen, E., Hart, J.A., Qi, Y., Kotov, N.A. "Diffusional Self-Organization in Exponential Layer-by-Layer Films with Micro- and Nanoscale Periodicity" **Angewandte Chemie** (2009) 7;48(38) 7073-7077.
 29. Podsiadlo, P., Arruda, E.M., Kheng, E., Waas, A.M., **Lee, J.**, Qin, M., Chuang, E., Kaushik, A.K., Kim, H-S., Noh, N-S., Kotov, N.A. "Layer-by-Layer Assembled Laminates with Hierarchical Organization from Nano- to Microscale: High-Toughness Nanomaterials and Deformation Imaging" **ACS Nano** (2009) 23;3(6) 1564-72.
 30. Nichols, J.E., Cortiella, J., **Lee, J.**, Niles, J.A., Cuddihy, M., Wang, S., Bynam, S., Cantu, A., Mlcak, R., Valdivia, E., Yancy, R., Bielitzki, J., McClure, M. L., Kotov, N.A. "In vitro Analog of Human Bone Marrow from 3D Scaffolds with Biomimetic Inverted Colloidal Crystal Geometry" **Biomaterials** (2009) 30(6) 1071-1079.
Highlight in the Economist, Highlight in Science Daily
 31. Tang, Z.*, Podsiadlo, P., Shim, B-S., **Lee, J.**, Kotov, N.A.* "The Effect of Stabilizer Density on Transformation of CdTe Nanoparticles Induced by Ag Cations" **Advanced Functional Materials** (2008) 18(23) 1-8.
 32. Podsiadlo, P., Michel, M., **Lee, J.**, Kam, N-S-W., Ball, V., Lee, J., Qi, Y., Hart, J.A., Hammond, P.T., Kotov, N.A. "Exponential Growth of Stratified LBL Films from Inorganic Sheets" **Nano Letters** (2008) 8 (6) 1762-1770.
 33. Srivastava, S., Ball, V., Podsiadlo, P., **Lee, J.**, Ho, P., Kotov, N.A. "Reversible Loading and Unloading of Semiconducting Nanoparticles in Exponential LBL Films" **Journal of the American Chemical Society** (2008) 130(12) 3748-3749.
 34. **Lee, J.**, Cuddihy, M.J., Kotov, N.A. "Three-dimensional Cell Culture Matrices: State of The Art" **Tissue Engineering Part B: Review** (2008) 14(1) 61-86. (Citation: 1164 as of 6/2022)

35. Podsiadlo, P., Sinani, V.A., Kam, N-W-S., bahng, J-H., **Lee, J.**, Kotov, N.A. "Gold Nanoparticles Enhance Anti-Leukemia Action of a Chemotherapeutic Agent," **Langmuir** (2008) 24(2) 568-574. (Front Cover Article)
36. Mehta, G., Kiel, M.K., **Lee, J.**, Kotov, N.A., Linderman, J.J., Takayama, S. "Polyelectrolyte-Clay-Protein Layer Films on Microfluidic PDMS Bioreactor Surfaces for Primary Murine Bone Marrow Culture" **Advanced Functional Materials** (2007) 17(15) 2701-2709.
37. Lee, J., Hernandez, P., **Lee, J.**, Govorov, A.O., Kotov, N.A. "Exciton-plasmon Interactions in Molecular Spring Assemblies of Nanowires and Wavelength-Based Protein Detection" **Nature Materials** (2007) 6(4) 291-295.
38. **Lee, J.**, Shanbhag, S., Kotov, N.A. "Inverted Colloidal Crystals Scaffolds as Three Dimensional Microenvironments for Cellular Co-cultures" **Journal of Materials Chemistry** (2006) 16(35), 3558-3564. (Front Cover Article)
39. Shanbhag, S., **Lee, J.**, Kotov, N.A. "Diffusion in Three Dimensionally Ordered Scaffolds with Inverted Colloidal Crystal Geometry", **Biomaterials** (2005) 26(27) 5581-5585.
40. Liu, Y., Wang, S., **Lee, J.**, Kotov, N.A. "A Floating Self-Assembly Route to Colloidal Crystal Templates for 3D Cell Scaffolds" **Chemistry of Materials** (2005) 17(20) 4918-4924.
41. Podsiadlo, P., Paternel, S., Rouillard, J-M., Zhang, Z., Lee, J., **Lee, J.**, Gulari, E., Kotov, N.A. "Layer-by-Layer Assembly of Nacre-like Nanostructured Composites with Antimicrobial Properties" **Langmuir** (2005) 21(25) 11915-11921.
42. Podsiadlo, P., Choi, S-Y., Shim, B., **Lee, J.**, Cuddihy, M., Kotov, N.A. "Molecularly Engineered Nanocomposites: Layer-by-Layer Assembly of Cellulose Nanocrystals" **Biomacromolecules** (2005) 6(6) 2914-2918.
43. Shanbhag, S., **Lee, J.**, Kotov, N. A. "Cell Scaffolds with Three-Dimensional Order: The Role of Modelling in Establishing Design Guidelines" **Australian Journal of Chemistry** (2005) 58(10) 713-715.

RESEARCH SUPPORT

Active grants

1. **NIH-National Cancer Institute** (R01CA237171): (3/5/19 – 5/31/24) PI
"Implantable pre-metastatic niche to elucidate the impact of chemotherapy-induced metastatic relapse."
2. **NSF-CBET (Engineering of Biomedical Systems)** (1944188): (3/1/20 – 2/29/25) PI
"CAREER: Tissue engineering, hematopoietic trabecular bone marrow."
3. **METAvisor Early Career Investigator Award** (6/5/20 – 6/4/21) PI
"Tissue-engineered bone to determine the impact of chemotherapy-induced premature aging in breast tumor metastasis."
4. **Ottugi Foundation** (international collaboration) (2/1/20 – 1/31/23) (co-PI)
"Assessing the impact of eggshell for bone tissue regeneration."

CHAIR GRADUATE STUDENT DISSERTATION

Current Post-Doc Fellow

Yongkuk Park, Ph.D	Chemical Engineering	(5/2022 – Present)
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Current Ph.D. advisees

1. Connor Giles	Ph.D. candidate in Chemical Engineering	(9/2019 – Present)
2. Jun-Goo Kwak	Ph.D. candidate in Molecular & Cellular Biology	(9/2019 – Present)
3. Patrick Ryan	Ph.D. candidate in Molecular & Cellular Biology	(5/2021 – Present)
4. Seema Amin	Ph.D. pre-candidate in Molecular & Cellular Biology	(5/2022 – Present)

Former Ph.D. Advisees

Dr. Yongkuk Park	Ph.D. in Chemical Engineering	(9/2016 – 4/2022)
Dr. Ryan Carpenter	Ph.D. in Chemical Engineering	(9/2014 – 5/2020)
Dr. Abhinav Sharma	Ph.D. in Chemical Engineering	(9/2014 – 6/2020)

MENTORED UNDERGRADUATE STUDENTS IN RESEARCH VIA INDEPENDENT STUDY

From UMass-Amherst: 62 students (ChE: 32, BMB: 11, BIO: 8, BME: 5, mBIO: 3, MIE: 2, PBS: 1) (Men: 32, Women: 30)