

DAN DONGEUN HUH

CURRICULUM VITAE

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Associate Professor
Department of Bioengineering
University of Pennsylvania

EDUCATION & TRAINING

- 2009 – 2012 **Harvard University**
Wyss Institute for Biologically Inspired Engineering
Wyss Technology Development Fellow & Research Associate
- 2007 – 2009 **Harvard Medical School & Children's Hospital Boston**
Postdoctoral Research Fellow
- 2007 – 2007 **University of Michigan, Ann Arbor**
Postdoctoral Research Fellow
- 2004 – 2007 **University of Michigan, Ann Arbor**
Ph.D. in Biomedical Engineering
- 2000 – 2002 **University of Michigan, Ann Arbor**
M.S. in Biomedical Engineering
M.S. in Mechanical Engineering
- 1994 – 2000 **Seoul National University**
B.S. in Mechanical Engineering

ACADEMIC APPOINTMENTS

- 7/2019 – present **Associate Professor**
Department of Bioengineering, University of Pennsylvania
- 8/2013 – 6/2019 **Assistant Professor**
Department of Bioengineering, University of Pennsylvania
- 8/2013 – present **Wilf Family Term Endowed Chair**
University of Pennsylvania
- 3/2012 – 7/2013 **Assistant Professor**
Department of Biomedical Engineering, College of Medicine, Seoul National University

HONORS AND AWARDS

- 2020 Chan Zuckerberg Initiative Award
- 2019 Bernard Langer Distinguished Lectureship, University of Toronto
- 2018 Lush Prize (with a monetary prize of £50,000), Lush
- 2018 Alice R. McPherson Distinguished Lectureship, University of Wisconsin, Madison
- 2017 The CRI Technology Impact Award, Cancer Research Institute
- 2017 John J. Ryan Medal, Royal College of Surgeons in Ireland
- 2016 *Analytical Chemistry* Young Innovator Award, *Analytical Chemistry* and the Chemical and Biological Microsystems Society (CBMS)
- 2015 Finalist, 2015 National Collegiate Inventors Competition
- 2015 Design of the Year Award, London Design Museum
- 2015 Best Product Design of the Year Award, London Design Museum
- 2015 TEDx Fellow, Technology, Entertainment, and Design (TED)
- 2015 Lifetime Membership, Museum of Modern Art (MoMA)
- 2015 Featured Designer for Organs-on-Chips acquired by the Museum of Modern Art (MoMA), New York
- 2014 NIH Director's New Innovator Award, National Institutes of Health (NIH)

- 2013 New England's Breakthrough Inventions and Inventors, Museum of Science & Boston Patent Law Association
- 2013 Wilf Family Term Endowed Chair, University of Pennsylvania (2013 – present)
- 2013 NC3Rs Annual Award, National Centre for the Replacement, Refinement, and Reduction of Animals in Research, London
- 2012 Best Paper Award, Korean Society of Medical and Biological Engineering
- 2012 SLAS Innovation Award, Society for Lab Automation and Screening
- 2011 Finalist, INDEX: Design for Life Award
- 2011 The Top 100 Science Stories of 2010, Discover Magazine
- 2011 Scientific Breakthrough of the Year, American Thoracic Society
- 2011 Best Publication Award, Nanotoxicology Specialty Section, Society of Toxicology
- 2011 Best Postdoctoral Award, In Vitro and Alternative Methods Annual Competition, Society of Toxicology
- 2009 Wyss Technology Development Fellowship, Wyss Institute for Biologically Inspired Engineering, Harvard University (2009 – 2012)
- 2007 Best Poster Award, 2007 Gordon Research Conference on Physics and Chemistry of Microfluidics
- 2007 Best Talk of the Year Award, Microfluidics Interdisciplinary Seminar Series, University of Michigan
- 2006 Best Poster Award in Tissue Engineering and Biomechanics, 2006 Engineering Symposium, University of Michigan
- 2005 Distinguished Achievement Award, University of Michigan
- 2005 Best Poster Award, 2005 NASA Bioscience and Engineering Institute Symposium
- 2005 Horace H. Rackham Predoctoral Fellowship, University of Michigan
- 2004 Widmer Best Poster Award, 2004 International Conference on Miniaturized Systems in Chemistry and Life Sciences (microTAS 2004)
- 1997-1999 Mechanical Engineering Department Scholarship, Seoul National University

PUBLICATIONS

1. A Georgescu, J Oved, S Mehta, M Kim, E Diffenderfer, GS Worthen*, **D Huh***, "Self-assembled hematopoietic niche and emergent innate immunity on a chip," *submitted*.
2. **D. Huh**, "Microengineered avatars of human tissues in space," submitted (invited by ***Nature Materials***).
3. SE Park, S Kang, J Paek, A Georgescu, AY Yi, **D. Huh**, "Geometric engineering of organoid culture for enhanced organogenesis in a dish," *submitted*.
4. M Mondrinos, F Alisaifei, YS Yi, H Ahmadzaeh, I Lee, C Blundell, J Seo, M Osborn, T Chun, SM Kim, VB Shenoy, **D Huh**, "Surface-directed cellular sculpting of engineered tissue anisotropy," *submitted*.
5. JY Park, S Mani, C Blundell, R Young, J Kanter, S Gordon, AY Yi, M Mainigi*, **D Huh***, "Modeling the endometrial-placental interface in human implantation-on-a-chip," *submitted*. ***co-corresponding authors**
6. Y Shim, Y Lim, T Kwak, JH Hwang, A Georgescu, **D Huh***, D Kim*, T Kang*, "Microfluidic Multi-scale Homogeneous Mixing with Uniform Residence Time Distribution for Rapid Production of Various Metal Core-shell Nanoparticles," ***Advanced Functional Materials***, in press ***co-corresponding authors**
7. I Poventud-Fuentes, KW Kwon, J Seo, M Tomaiuolo, TJ Stalker, LF Brass, **D Huh**, "A human vascular injury-on-a-chip model of hemostasis," ***Small*** 2020, in press.
8. S.E. Park, J. Ahn, H.-E. Jeong, K.-I. Song, I. Youn, **D. Huh***, S. Chung*, "In vitro model of three-dimensional peripheral myelination," ***NPG Asia Mater.*** 2020, in press. ***co-corresponding authors**
9. M Ali, M Sajid, MAU Khalid, SW Kim, JH Lim, **D Huh**, KH Choi, "A fluorescent lateral flow biosensor for the quantitative detection of Vaspin using upconverting nanoparticles," ***Spectrochim. Acta A*** 2020, 226, 117610.
10. YJ Chen, T Yamazoe, KF Leavens, FL Cardenas-Diaz, A Georgescu, **D Huh**, PJ Gadue, BZ Stanger, "iPreP: a three-dimensional nanofibrillar cellulose hydrogel platform for long-term ex vivo preservation of human islets," ***JCI Insight*** 2019, 4, 124644.

11. J Seo, WY Byun, F Alisafaei, A Georgescu, M Massaro-Giordano, VB Shenoy, V Lee, V Bunya, **D Huh**, "Multiscale reverse engineering of the human ocular surface," *Nat. Med.* 2019, 25, 1310-1318.
12. S.E. Park, A. Georgescu, **D. Huh**, "Organoids-on-a-chip," *Science* 2019, 364, 960-965.
13. J Paek, SE Park, Q Lu, KT Park, M Cho, JM Oh, KW Kwon, YY Yi, JW Song, H.I. Edelstein, J. Ishibashi, W. Yang, JW Myerson, RY Kiseleva, P Aprelev, ED Hood, D Stambolian, P Seale, VR Muzykantor, **D. Huh**, "Microphysiological engineering self-assembled and perfusable microvascular beds for the production of vascularized three-dimensional human microtissues," *ACS Nano* 2019, 13, 7627-7643.
14. S.E. Park, A. Georgescu, J.M. Oh, K.W. Kwon, **D. Huh**, "Polydopamine-based interfacial engineering of three-dimensional cell culture for production and long-term maintenance of *in vitro* tissue constructs," *ACS Appl. Mater. Interfaces* 2019, 11, 23919-23925.
15. J. Chang, J. Lee, A. Georgescu, **D. Huh**, T. Kang, "Generalized on-demand production of nanoparticle monolayers on arbitrary solid surfaces via capillarity-mediated inverse transfer," *Nano Lett.* 2019, 19, 2074-2083.
16. **D. Huh**, "Bioengineering and Metabolism Voices," *Cell Metabolism* 2019, 29, 506-512.
17. P. Elkington, M. Lerm, N. Kapoor, R. Mahon, E. Pienaar, **D. Huh**, D. Kaushal, D. Kaushal, L. Schlesinger, "In vitro granuloma models of tuberculosis: potential and challenges," *J. Infect. Dis.* 2019, 24, 1858-1866.
18. J. Seo, **D. Huh**, "Microphysiological models of human organs: a case study on microengineered lung-on-a-chip systems," *Microfluidic Cell Culture Systems*, Ed. Borenstein, J. 2019, in press.
19. **D. Huh**, "Microphysiological models of the respiratory system," *Biofabrication and 3D Tissue Modeling, Biomaterials Science Series*. Ed. Cho, D.-W. 2019, in press.
20. K. Gkatzis, S. Taghizadeh, **D. Huh**, D.Y.R. Stainier, S. Bellusci, "Using 3D organoids and lung-on-a-chip methods to study lung development, regeneration, and disease," *Eur. Respir. J.* 2018, 52, doi: 10.1183/13993003.00876-2018.
21. J. Song, J. Paek, K.T. Park, J. Seo, **D. Huh**, "A bioinspired microfluidic model of mucus plug-induced airway injury," *Biomicrofluidics* 2018, 12, 042211 (**Editor's pick**).
22. C. Blundell, Y.S. Yi, L. Ma, E. Tess, M. Farrell, A. Georgescu, L. Aleksunes, **D. Huh**, "Placental drug transport-on-a-chip: a microengineered *in vitro* model of transporter-mediated drug efflux in the human placental barrier," *Adv. Healthc. Mater.* 2017, doi: 10.1002/adhm.201700786 (**cover article**).
23. A.J. Clippinger, D. Allen, A.M. Jarabek, M. Corvaro, M. Gaça, S. Gehen, J.A. Hotchkiss, G. Patlewicz, J. Melbourne, P. Hinderliter, M. Yoon, **D. Huh**, A. Lowit, B. Buckley, M. Bartels, K. Bérubé, D.M. Wilson, I. Indans, M. Vinken, "Alternative approaches for acute inhalation toxicity testing to address global regulatory and non-regulatory data requirements: An international workshop report," *Toxicol. In Vitro* 2018, 48, 53-70.
24. M. Mondrinos, Y.S. Yi, N.K. Wu, X. Ding, **D. Huh**, "Natural extracellular matrix-derived semipermeable, optically transparent semipermeable membrane inserts for microfluidic cell culture," *Lab Chip* 2017, 17, 3146-3158.
25. J. Seo, D. Conegliano, M. Farrell, M. Cho, X. Ding, T. Seykora, D.Y. Qing, N.S. Mangalmurti, **D. Huh**, "A microfluidic model of red blood cell transfusion-induced pulmonary vascular injury," *Sci. Rep.* 2017, DOI: 10.1038/S41598-017-03597-w.
26. S.H. Yang, J.W. Choi, **D. Huh**, H.A. Jo, S. Kim, C.S. Lim, J.C. Lee, H.C. Kim, H.M. Kwon, C. Kwak, K.W. Joo, Y.S. Kim, D.K. Kim, "Roles of fluid shear stress and retinoic acid on the differentiation of primary cultured human podocytes." *Exp. Cell Res.* 2017, 354, 48-56.
27. S. Han, Y. Shin, H.E. Jeong, J. Jeon, R. Kamm, **D. Huh**, L. Sohn, and S. Chung, "Constructive remodeling of a synthetic endothelial extracellular matrix," *Sci. Rep.* 2016, DOI:10.1038/srep18290.
28. C. Blundell, E. Tess, A. Schanzer, C. Coutifaris, E. Su, S. Parry, **D. Huh**, "A microengineered model of the human placental barrier," *Lab Chip* 2016, DOI: 10.1039/C6LC00259E.
29. Y.S. Choi, E. Hyun, J. Seo, C. Blundell, H.C. Kim, E. Lee, S. Lee, W.K. Moon, **D. Huh**, "A microengineered model of early-stage breast cancer," *Lab Chip* 2015, 15, 3350-3357.
30. J.S. Lee, Y.M. Han, H.C. Kim, C.J. Kim, R. Romero, J.S. Hong, **D. Huh**, "Placenta-on-a-chip: a novel platform to study the biology of human placenta," *J. Matern. Fetal Neonatal Med.* 2015, 17, 1-9.
31. **D. Huh**, "A human breathing lung-on-a-chip," *Ann. Am. Thorac. Soc.* 2015, 12, S42-S44.

32. E. Esch, A. Bahinski, **D. Huh**, "Organs-on-chips at the frontiers of drug discovery," *Nat. Rev. Drug Discov.* 2015, 14, 248-260.
33. D.Y. Qing, D. Conegliano, J. Seo, J.P. Reilly, M.G. Shashaty, G.S. Worthen, **D. Huh**, N.J. Meyer, N.S. Mangalmurti, "RBC transfusion increases susceptibility to lung inflammation through high mobility group box 1 released by necroptosis of lung endothelial cells," *Am. J. Respir. Crit. Care Med.* 2014, 190, 1243-1254.
34. S. Choi, Y. Hong, I. Lee, **D. Huh**, T.-J. Jeon, S.M. Kim, "Effects of various extracellular matrix proteins on the growth of HL-1 cardiomyocytes," *Cells Tissues Organs* 2014, 198, 349-356.
35. **D. Huh***, H.J. Kim, J.P. Fraser, D.E. Shea, M. Khan, A. Bahinski, G.A. Hamilton, D.E. Ingber*, "Microfabrication of human organs-on-chips," *Nat. Protoc.* 2013, 8, 2135-2157. ***co-corresponding authors**
36. **D. Huh**, D.C. Leslie, B.D. Matthews, J.P. Fraser, S. Jurek, G.A. Hamilton, K.S. Thorneloe, M.A. McAlexander, D.E. Ingber, "A human disease model of drug toxicity-induced pulmonary edema in a lung-on-a-chip microdevice," *Science Trans. Med.* 2012, 4, 1-8 (cover article); **Awarded the NC3Rs Annual 3Rs Prize; Featured in Science, Reuters, Fox News, etc.**
37. J. Park, K.B. Kim, J. Lee, H.C. Kim, **D. Huh***, "Organomimetic Microsystems Technologies," *Biomed. Eng. Lett.* 2012, 2, 88-94; **Awarded KSMBE Best Publication Award**
38. **D. Huh**, Y. Torisawa, G.A. Hamilton, H.J. Kim, D.E. Ingber, "Microengineered physiological biomimicry: organs-on-chips," *Lab Chip* 2012, 12, 2156-2164.
39. H.J. Kim, **D. Huh**, G.A. Hamilton, D.E. Ingber, "Human gut-on-a-chip inhabited by microbial flora that experiences intestinal peristalsis-like motions and flow," *Lab Chip* 2012, 12, 2165-2174.
40. **D. Huh**, G.A. Hamilton, D.E. Ingber, "From three dimensional cell culture to organs-on-chips," *Trends Cell Biol.* 2011, 21, 745-754.
41. T. Mammoto, A. Mammoto, T. Tat, Y. Torisawa, A. Gibbs, R. Derda, R. Mannix, M. de Bruijin, C.W. Yung, **D. Huh**, D.E. Ingber, "Mechanochemical control of mesenchymal condensation and embryonic tooth organ formation," *Dev. Cell* 2011, 21, 758-769.
42. **D. Huh**, B. D. Matthews, A. Mammoto, M. Montoya, H.Y. Hsin, D.E. Ingber, "Reconstituting organ-level lung functions on a chip," *Science* 2010, 328, 1662-1668; **Named to Top 100 Science Stories of 2010 (Discover Magazine); Faculty of 1000 Exceptional; Featured in Nature, Lab on a Chip, Scientific American, Popular Mechanics, ABC, CBS, Bloomberg, LA times, Boston Globe, etc.**
43. K. L. Mills, **D. Huh**, S. Takayama, M. D. Thouless, "Instantaneous fabrication of arrays of normally closed, adjustable, and reversible nanochannels by tunnel cracking," *Lab Chip* 2010, 10, 1627-1630.
44. H. Tavana, C.-H. Kuo, Q.Y. Lee, B. Mosadegh, **D. Huh**, P.J. Christensen, J.B. Grotberg, S. Takayama, "Dynamics of Liquid Plugs of Buffer and Surfactant Solutions in a Micro-Engineered Pulmonary Airway Model," *Langmuir* 2010, 26, 3744-3752.
45. A. Mammoto, K.M. Connor, T. Mammoto, C.W. Yung, **D. Huh**, C.M. Aderman, G. Mostoslavsky, L.E.H. Smith, D.E. Ingber, "A Mechanosensitive Transcriptional Mechanism that Controls Angiogenesis," *Nature* 2009, 457, 1103-1111.
46. **D. Huh**, C.H. Kuo, J.B. Grotberg, S. Takayama, "Gas-Liquid Two-Phase Flow Patterns in Rectangular Polymeric Microchannels", *New J. Phys.* 2009, 15, Art. No. 075034 .
47. Y. Zheng, H. Fujioka, S. Bian, Y. Torisawa, **D. Huh**, S. Takayama, J.B. Grotberg, "Liquid Plug Propagation in Flexible Microchannels – A Small Airway Model." *Phys. Fluids* 2009, 21, Art. No. 071903.
48. H. Tavana, **D. Huh**, J.B. Grotberg, S. Takayama, "Microfluidics, Lung Surfactant, and Respiratory Disorders," *Labmedicine* 2009, 40, 203-209.
49. H. Tavana, **D. Huh**, J.B. Grotberg, S. Takayama, "Pulmonary Airways on a Chip: A New Approach to Study Respiratory Disorders", *BioForum Europe* 2009, 7-8, 14-16.
50. Y. Kamotani, T. Bersano-Begey, N. Kato, Y.-C. Tung, **D. Huh**, J.W. Song, S. Takayama, "Individually Programmable Cell Stretching Microwell Arrays Actuated by a Braille Display," *Biomaterials* 2008, 29, 2646-2655.
51. N. Douville, **D. Huh**, S. Takayama, "DNA Linearization through Confinement in Nanofluidic Channels," *Anal. Bioanal. Chem.* 2008, 391, 2395-2409.

52. **D. Huh**, K. L. Mills, X. Zhu, M.A. Burns, M. D. Thouless, S. Takayama, "Tuneable Elastomeric Nanochannels for Nanofluidic Manipulation," *Nat. Mater.* 2007, 6, 424-428.
53. **D. Huh**, H. Fujioka, Y.-C. Tung, N. Futai, R. Paine III, J.B. Grotberg, S. Takayama, "Acoustically Detectable Cellular-Level Lung Injury Induced by Fluid Mechanical Stresses in Microfluidic Airway Systems," *Proc. Nat. Acad. Sci. U. S. A.* 2007, 104, 18886-18891; **Featured in Nature and Lab on a Chip.**
54. **D. Huh**, J.H. Bahng, Y. Ling, H.-H. Wei, O.D. Kripfgans, J.B. Fowlkes, J.B. Grotberg, S. Takayama, "Gravity-Driven Microfluidic Particle Sorting Device with Hydrodynamic Separation Amplification," *Anal. Chem.* 2007, 79, 1369-1376.
55. **D. Huh**, Y. Kamotani, J.B. Grotberg, S. Takayama, "Engineering pulmonary epithelia and their mechanical microenvironments" *Micro- and Nanoengineering of the Cell Microenvironment: Technologies and Applications*, Ed. Khademhosseini, 2007, 503-533.
56. Y. Torisawa, B. Chueh, **D. Huh**, P. Ramamurthy, T.M. Roth, K.F. Barald, S. Takayama, "Efficient Formation of Uniform-Sized Embryoid Bodies Using a Compartmentalized Microchannel Device", *Lab Chip* 2007, 7, 770-776.
57. B. Chueh, **D. Huh**, C.R. Kyrtos, T. Houssin, N. Futai, S. Takayama, "Leakage-Free Bonding of Porous Membranes into Layered Microfluidic Array Systems," *Anal. Chem.* 2007, 79, 3504-3508.
58. A.J. Calderón, Y. Heo, **D. Huh**, N. Futai, S. Takayama, J.B. Fowlkes, J.L. Bull, "A Microfluidic Model of Bubble Lodging in Microvessel Bifurcations," *Appl. Phys. Lett.* 2006, 89, Art. No. 244103.
59. **D. Huh**, W. Gu, Y. Kamotani, J.B. Grotberg, S. Takayama, "Microfluidics for Flow Cytometric Analysis of Cells and Particles," *Physiol. Meas.* 2005, 26, R73-R98; **Best Review published in Physiol. Meas. in 2005.**
60. Y. Kamotani, **D. Huh**, N. Futai, S. Takayama, "At the Interface: Advanced Microfluidic Assays for Study of Cell Function," *Therapeutic Micro/NanoTechnology*, Ed. Bhatia, S.; Desai, T. **2004**, 55-78.
61. **D. Huh**, A.H. Tkaczyk, J.H. Bahng, Y Chang, H.-H. Wei, J.B. Grotberg, C.-J. Kim, K. Kurabayashi, S. Takayama, "Reversible Switching of High-Speed Air-Liquid Two-Phase Flows Using Electrowetting-Assisted Flow-Pattern Change," *J. Am. Chem. Soc.* 2003, 125, 14678-14679.
62. **D. Huh**, Y.-C. Tung, H.-H. Wei, J.B. Grotberg, S.J. Skerlos, K. Kurabayashi, S. Takayama, "Use of Air-Liquid Two-Phase Flow in Hydrophobic Microfluidic Channels for Disposable Flow Cytometers," *Biomed. Microdev.* 2002, 2, 141-149.

PATENTS

1. **D. Huh**, KW Kwon, L Brass, I Poventud-Fuentes, "A human vascular injury-on-a-chip model of hemostasis," **2020**, US 63/107,978
2. **D. Huh**, ES Park, W. Yang, D. Stambolian, "Microengineered models of the human eye and methods of use," **2020**, US 17/074,074
3. **D. Huh**, C. Blundell, "Artificial placenta and methods of preparation," **2020**, US Patent 20180044623
4. **D. Huh**, A. Georgescu, "Fluidic teleportation and advanced biological virtualization for large-scale integration of organ-on-chip devices," **2020** US 63/015,242
5. **D. Huh**, SE. Park, "Geometric engineering of organoid culture for enhanced organogenesis," **2020**
6. **D. Huh**, SE. Park, "Artificial human blood-retina barrier model and methods of preparation," **2020**
7. **D. Huh**, A. Georgescu, J. Seo. G.S. Worthen, "Artificial bone marrow model and methods of preparation," **2019**
8. **D. Huh**, J. Paek, "Cell culture devices for mimicking mechanically active three-dimensional tissues," **2019**
9. **D. Huh**, J. Seo, "Methods and devices for modeling the eye," **2015**, US Patent US10360819B
10. **D. Huh**, A. Georgescu, "Artificial human pulmonary airway and methods of preparation," **2018**, US 62/741,773
11. **D. Huh**, A. Georgescu, "Systems and methods for multilane vasculature," **2018**, US 62/648,209

12. **D. Huh**, M. Mondrinos, Y.S. Yi, "Native extracellular matrix-derived membrane inserts for organs-on-chips, multilayered microfluidics microdevices, bioreactors, tissue culture inserts, and two-dimensional and three-dimensional cell culture systems," **2017**, US 62/544,429
13. D. Levner, **D. Huh**, K.J. Jang, J. Fraser, J. Kerns, A. Varone, J. Nguyen, "Compositions and methods of cell attachment," **2016**, US 62/361,259
14. **D. Huh**, M. Mondrinos, "Systems and methods for immobilizing extracellular matrix material on organ on chip and multilayer microfluidics devices," **2016**, US 62/348,055
15. **D. Huh**, M. Mondrinos, "Fibrosis model on a chip," **2016**, US 62/348,036
16. **D. Huh**, J. Seo, "Systems and methods for producing microengineered models of the human cervix," **2015**, US 62/244,963
17. **D. Huh**, M. Mondrinos, "Lung disease models on a chip," **2015**, US 62/068,494
18. **D. Huh**, J.Y. Park, C. Blundell, D.W. Cho, "Decellularized organ-derived tissue engineering scaffolds," **2015**, US 62/190,130
19. S. Takayama, M.D. Thouless, **D. Huh**, K.L. Mills, N.J. Douville, "Tuneable Elastomeric Nanochannels for Nanofluidic Manipulation," **2015**, US Patent 8945909 B2
20. D.E. Ingber, **D. Huh**, "Organ mimic device with microchannels and Methods of Use and Manufacturing Thereof," **2014**, US Patent 86478616 B2
21. S. Takayama, J. Chang, **D. Huh**, X. Zhu, B. Cho, G.D. Smith, "Microfluidic Gravity Pump with Constant Flow Rate," **2010**, US patent 7704728
22. K. Kurabayashi, S. Takayama, S.J. Skerlos, **D. Huh**, J.B. Grotberg, Y.-C. Tung, "Flow Cytometers and Detection System of Lesser Size," **2008**, US Patent 7381565

RESEARCH FUNDING

ACTIVE

N/A

09/01/2020 – 08/31/25

Biomedical Advanced Research and Development Authority (BARDA), Department of Health & Human Services (Role: PI)

Amount: \$1,000,000 direct/year

Inhalation toxicology of chlorine gas-on-a-chip

This project will harness the power of lung-on-a-chip technology to create bioengineered in vitro platforms that can i) reproduce the living tissues of the human respiratory tract and their native microenvironment, ii) simulate realistic and physiologically relevant exposure conditions during chlorine inhalation, and iii) visualize and measure an array of biological responses to chlorine gas for quantitative microfluorimetric and multi-omics analysis.

1UG3TR002198-01

09/01/2017 - 08/31/2021

Amount: \$500,000 direct/year

NIH/NCATS/CASIS (Role: PI)

Lung host defense in microgravity

The goals of this project are to test the feasibility of engineering individual microphysiological systems to model the airway and bone marrow that can be delivered to orbit (UG3) and to combine the models to emulate and understand the integrated immune responses of the human respiratory system in microgravity (UH3).

1UG3DK122644-01

07/01/2019-06/30/2024

Amount: \$749,261 direct/year

NIH/NIDDK (Role: PI)

Microphysiological systems for modeling autoimmunity in type I diabetes

This project aims to create robust systems containing human islet cells, immune cells, and other features to recapitulate the process of islet autoimmunity in type I diabetes.

CRI Technology Impact Award

09/01/2017-08/31/2020

Amount: \$335,000 direct/year

Cancer Research Institute (Role: PI)

A microengineered biomimetic model of tumor-immune cell interactions

This project aims to create a microengineered “cancer-on-a-chip” model using patient-derived cells to reconstitute vascularized adenocarcinoma in the human lung and to investigate physiologically relevant interaction of malignant tumor tissue with innate and adaptive immune cells for the study of cancer immunotherapy.

1R01ES029275-01

09/01/2018-08/31/2023

Amount: \$400,000 direct/year

NIH/NIEHS (Role: PI)

Placental responses to environmental chemicals

This project aims to use a highly translational approach to characterize barrier mechanisms, such as transporters, that can protect the placenta from cadmium toxicity and identify babies at the greatest risk of low birth weight following cadmium exposure.

Chan-Zuckerberg Initiative Award

09/01/2020-08/31/2022

Amount: \$225,000 direct/year

Chan-Zuckerberg Initiative (Role: PI)

Impact of maternal inflammation on pregnancy

This project aims to study the effect of inflammation on the development of adverse pregnancy outcomes in the human placenta at the early stage of pregnancy.

N/A

10/01/2017-2/28/2021

Amount: \$85,000 direct/year

Penn Parker Institute for Cancer Immunotherapy (Role: subcontract PI)

Microengineered platforms for culturing explants of immune organs

The aim of this project is to develop microengineered cell culture platforms for modeling the complexity of the tumor microenvironment for applications in cancer immunotherapy research.

N/A

01/01/2020-12/31/2020

Amount: \$50,000 direct/year

Penn Center for Health, Devices, and Technology (Role: PI)

Human blinking eye-on-a-chip for in vitro testing of contact lenses

This project focuses on utilizing a human blinking eye-on-a-chip system to develop a novel in vitro platform to test biocompatibility of contact lenses and related ophthalmic products.

N/A

02/01/2019-01/31/2022

Amount: \$55,000 direct/year

Ministry of Trade, Industry & Energy of the Republic of Korea (Role: subcontract PI)

Development of evaluation method system based on multi-skin on a chip for animal-free cosmetics toxicity and efficacy testing

This study aims to develop a vascularized human skin model for high-content and animal-free screening of cosmetics.

N/A

02/01/2020-01/31/2021

Amount: \$15,000 direct/year

Penn Institute for Translational Medicine and Therapeutic (Role: PI)

Ebola Virus VP40-Induced Ocular Pathology and Treatment

The goal of this project is to generate reagents and optimize assays for protein expression in ocular cells.

1R21EY031465-01

Harty (PI)

06/01/2020-05/31/2022

Amount: \$234,000 direct/year

NIH/NEI (Role: Co-Investigator)

Predicted role of Ebola VP40-host interactions in ocular pathology and persistence

The aim of this study is to determine whether the interplay between VP40 and tight junction proteins modulates permeability of retinal and corneal barrier layers, and whether our novel antiviral therapeutics can block VP40 mediated egress and spread using an eye-on-a-chip organ system.

N/A **Shenoy (PI)** **09/01/2016-08/31/2021**
National Science Foundation (Role: Co-Investigator)
The Center for Engineering Mechanobiology
The Center for Engineering MechanoBiology (CEMB) is a multi-institutional Science and Technology Center funded by the NSF to advance the study of mechanical forces in molecules, cells, and tissues in plants and animals.

N/A **Meaney, Smith (PI)** **09/01/2017-08/31/2022**
Amount: \$1,850,000 direct/year
Paul G. Allen Family Foundation (Role: Co-Investigator)
Reconstructing Concussion
The goal of this project is to build the multi-scale principles of impairment and recovery of concussion from individual circuit to the whole brain.

COMPLETED

1DP2HL127720 **09/01/2014-08/31/2019**
Amount: \$300,000 direct/year
NIH Director's New Innovator Award (Role: PI)
Probing the physics of chronic lung disease using microphysiological biomimicry
The aim of this project is to develop a microphysiological model of chronic asthma in human lungs to study how pathological mechanical forces affect inflammation and tissue remodeling of small airways during the progression of asthma.

1UC4DK104196-01 **09/20/2014-06/30/2019**
Amount: \$928,000 direct/year
NIH/NIDDK (Role: MPI)
A vascularized 3D biomimetic for islet function and physiology
This project aims to create a biomimetic microsystem that will facilitate long-term culture and manipulation of human islets in vitro and to optimize human islet function with respect to glucose sensing, insulin release, and stable maintenance of islet phenotypes.

U24DK076169 **01/01/2016-12/31/2017**
Amount: \$236,000 direct/year
NIH/NIDDK (Role: PI)
Development and functional analysis of a human adipose tissue chip
This project aims to establish a stem cell-based three-dimensional (3D) microphysiological model that reconstitutes key microarchitecture, cellular heterogeneity, and physiological function of human subcutaneous white adipose tissue.

N/A **06/30/2017-06/30/2018**
Amount: \$75,000 direct/year
Penn Institute for Immunology (Role: PI)
Influenza infection in an autologous human airway-on-a-chip
This project aims to develop a microengineered autologous model of the human airway device to test influenza.

N/A **09/01/2016-8/31/31/2016**
Amount: \$40,000 direct/year
Alternatives Research & Development Foundation (Role: PI)

A microengineered "cervix-on-a-chip" as an alternative to animal models for the study of premature cervical remodeling in preterm birth

This study aims to develop a microengineered model of ascending infection-induced premature cervical remodeling.

N/A **01/01/2015-12/31/2016**

Amount: \$100,000 direct/year

The Penn Institute for Regenerative Medicine (Role: PI)

Bioengineering human hair follicles in vitro using skin stem cells

The aim of this project is to develop a microfabricated biomimetic cell culture platform to recapitulate native microarchitecture of human hair follicles for hair tissue engineering.

W911NF-12-2-0036 **Ingber (PI)** **07/01/2016 -06/30/2017**

Amount: \$53,000 direct/year

DARPA (Role: subcontract PI)

Integrated human organ-on-chip microphysiological systems

The goal of this project is to create and optimize a microengineered reproductive organ model that can be functionally integrated into the multi-organ platform being developed by the Wyss Institute in the DARPA multiphysiological systems program.

2012M3A7B4035286 **06/30/2013-06/29/2017**

Amount: \$18,000 direct/year

National Research Foundation of Korea (Role: PI)

Development of Biomimetic lung disease models for testing and optimization of composite nanostructure-based sensor systems

The overarching goal of this study is to design and fabricate a microfluidic lung cancer model integrated with ultrasensitive in-line nanosensors based on biochemically functionalized carbon nanotube networks.

N/A **Mangalmurti (PI)** **09/30/2015-09/29/2018**

Amount: \$370,000 direct/year

Department of the Army (Role: Co-Investigator)

Role of HMGB1 in Transfusion-Mediated Lung Inflammation

The primary goal of this project is to identify and characterize HMGB1 and its binding partners in the plasma of patients with early sepsis.

N/A **Driscoll (PI)** **11/01/2014 -10/31/2019**

March of Dimes (Role: Co-Investigator)

The March of Dimes Prematurity Research Center at the University of Pennsylvania

The overall goal of this project is to create a microengineered model of the placental barrier to investigate the effect of abnormal cellular metabolism on placental dysfunction leading to spontaneous preterm birth.

INVITED LECTURES

1. **(Keynote lecture) *Microengineered Bio-mimicry of Human Physiological Systems***, IEEE EMBS Mini-Symposium on Micro & Nanotechnology in Medicine, December 2020
2. ***Microengineered Bio-mimicry of Human Physiological Systems***, The Frontiers of Science Lecture, Penn School of Dental Medicine, Philadelphia, PA, November 2020
3. **(Keynote lecture) *Microengineered Bio-mimicry of Human Physiological Systems***, Children's Healthcare of Atlanta's 19th annual Donald Schaffner Conference, Atlanta, GA, November 2020
4. ***Microengineered Bio-mimicry of Human Physiological Systems***, American Society of Reproductive Medicine (ASRM) Virtual Meeting, October 2020
5. ***Microengineered models of reproductive organs***, American Society of Reproductive Medicine (ASRM) Virtual Meeting, October 2020

6. ***Microengineered Bio-mimicry of Human Physiological Systems***, The 7th International Symposium of the Stem Cell and Regenerative Medicine Institute, Samsung Medical Center, Seoul, Korea, September 2020
7. ***Microengineered Bio-mimicry of Human Physiological Systems***, SNUBH CAT-EBM Symposium, Seoul National University Bundang Hospital, Korea, September 2020
8. ***Microengineered Bio-mimicry of Human Physiological Systems***, The 3rd NYU Biomedical and Biosystems Conference, Abu Dhabi, January 2020
9. ***Microengineered Bio-mimicry of Human Physiological Systems***, GlaxoKlineSmith (GSK), Collegeville, PA, November 2019
10. ***Microengineered Bio-mimicry of Human Physiological Systems***, Emulate Inc., Boston, MA, November 2019
11. **(Plenary lecture) *Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, The 32nd Annual Meeting of the Japanese Society for Alternatives to Animal Experiments, Tsukuba, Japan, November 2019
12. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, Department of Chemical Engineering, Sogang University, November 2019
13. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, NIH Tissue Chips & Biomaterials Workshop, NIH, MD, October 2019
14. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, Cold Spring Harbor Stem Cell Biology, Cold Spring Harbor, NY, September 2019
15. ***Microengineered Bio-mimicry of Human Physiological Systems***, Department of Mechanical Engineering, Korea University, August 2019
16. ***Microengineered Bio-mimicry of Human Physiological Systems***, Ministry of Food and Drug Safety, Osong, Korea, July 2019
17. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, The National Assembly Forum 4th Industrial Revolution in Biomedical Science and Animal Ethics, Seoul, Korea, May 2019
18. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems***, Hallym University Medical Center, Korea, May 2019
19. **(Distinguished lectureship) *Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Institute of Medical Science (IMS), University of Toronto, Toronto, Canada, May 2019
20. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, 2019 Korean Society for Biotechnology and Bioengineering Spring Meeting and International Symposium, Jeju, Korea, April, 2019
21. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, National Institute of Biomedical Imaging and Bioengineering, NIH, Bethesda, MD, USA, March 2019
22. **(Plenary lecture) *Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Current Status and Future of Cell Assay Technology, National Institute for Advanced Industrial Science and Technology (AIST), Tsukuba, Japan, January 2019
23. ***One New Thing***, IEEE Micro and Nanotechnology in Medicine Meeting, Kauai, HI, USA, December 2018
24. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Department of Mathematical Sciences, University of Delaware, Newark, DE, USA, December 2018
25. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Materials Research Society Meeting (MRS) Fall Meeting, Boston, MA, USA, November 2018
26. **(Plenary lecture) *Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Lush Conference, Berlin, Germany, November 2018
27. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Department of Mechanical and Aerospace Engineering, Ohio State University, Columbus, OH, USA, October 2018
28. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, The 4th International Cancer Immunotherapy Conference, New York, NY, USA, September 2018
29. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, Organ-on-a-Chip World Congress and 3D Bioprinting, San Diego, CA, USA, September 2018
30. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips***, The 11th World Congress for Microcirculation, Vancouver, Canada, September 2018

31. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Physics, Seoul National University, Seoul, Korea, August 2018
32. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Chemistry, Seoul National University, Seoul, Korea, August 2018
33. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Materials Science and Engineering, Seoul National University, Seoul, Korea, August 2018
34. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Biology, Seoul National University, Seoul, Korea, August 2018
35. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Mechanical Engineering, Seoul National University, Seoul, Korea, August 2018
36. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The 11th Annual Business Regenerative Medicine Conference, Philadelphia, PA, USA, July 2018
37. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Yonsei University College of Medicine, Seoul, Korea, June 2018.
38. **(Keynote lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The 10th International Symposium on Microchemistry and Microsystems, Busan, Korea, June 2018
39. **(Distinguished lectureship) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, McPherson Eye Research Institute (MERI) Endowed Lecturer, University of Wisconsin, Madison, WI, USA, May 2018
40. **(Keynote lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Ontario-on-a-Chip/ NSERC TOeP research day, University of Toronto, Toronto, Canada, May 2018
41. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Advancing Gene Editing Technologies for the Treatment of Cystic Fibrosis Lung Disease, NHLBI, Bethesda, MD, USA, March 2018
42. **New Developments in Organ Chip Designs: The Placenta-Chip and Eye-Chip**, 2018 AAAS Annual Meeting, Austin, TX, USA, February 2018
43. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Michigan Center on Lifestage Environmental Exposures and Disease, University of Michigan, Ann Arbor, MI, USA, January 2018
44. **Microengineered Lung-on-a-Chip Technology**, 3D In Vitro TB Granuloma Model, National Institute of Allergy and Infectious Diseases (NIAID), Rockville, MD, USA, January 2018
45. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, British Thoracic Society Winter Meeting 2017, London, UK, December 2017
46. **(Keynote lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Launch & Strategic Visioning Workshop, Canadian Center for Alternatives to Animal Methods, University of Windsor, Windsor, Ontario, Canada, October 2017
47. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, US-Korea Conference on Science, Technology and Entrepreneurship 2017 (UKC), Washington, DC, USA, August 2017
48. **Leveraging Organ-on-a-Chip Technology to Study the Human Placenta**, The Human Placenta Project (HPP) Annual Meeting, Bethesda, MD, USA, July 2017
49. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Division of Pulmonary and Critical Care Medicine, Seoul National University, Seoul, Korea, July 2017
50. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Mechanical Engineering, Inha University, Incheon, Korea, July 2017
51. **(Keynote lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, SELECTBIO Organ-on-a-chip Workshop, Boston, USA, July 2017
52. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Oak Ridge National Laboratory, Oak ridge, TN, USA, June 2017
53. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, 21st Congress of International Society of Aerosols in Medicine (ISAM), Santa Fe, NM, USA, June 2017
54. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Baltimore, MD, USA, May 2017
55. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Penn Cardiovascular Institute (CVI), University of Pennsylvania, Philadelphia, PA, USA, May 2017

56. **(Keynote lecture) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, SELECTBIO Organ-on-a-chip Workshop, Munich, Germany, May 2017
57. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, "Printing the Future of Therapeutics in 3D", Peter Wall Institute for Advanced Studies, University of British Columbia, Vancouver, Canada, May 2017
58. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Experimental Biology Annual Meeting, Chicago, IL, USA, April 2017
59. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Institute for Advanced Materials, Devices, and Nanotechnology (IAMDN), Rutgers University, NJ, USA, April 2017
60. **(Distinguished lectureship) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Annual Research Day, Royal College of Surgeons in Ireland, Dublin, Ireland, March 2017
61. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The Society of Toxicology (SOT) Annual Meeting, Baltimore, MD, USA, March 2017
62. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Department of Biomedical Engineering, UC Davis, CA, USA, February 2017
63. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The 2017 Association for Research in Otolaryngology Meeting, Baltimore, MD, USA, February 2017
64. **(Keynote lecture) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Society of Toxicology of Canada (STC) 47th Annual symposium, Ottawa, Canada, December 2016
65. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, IEEE Micro and Nanotechnology in Medicine Meeting, Hawaii, HI, USA, December 2016
66. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, NIDDK workshop "The Adipose Tissue Niche: Role in Health and Disease", Bethesda, MD, USA, November 2016
67. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, LifeNet Health Institute for Regenerative Medicine, Virginia Beach, VA, November 2016
68. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Penn Institute for Regenerative Medicine (IRM), Philadelphia, PA, USA, November 2016
69. **(Keynote lecture) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Korean Society of Biotechnology and Bioengineering (KSBB) Annual Meeting, Gwangju, Korea, October 2016
70. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Middle Atlantic Reproduction and Teratology Association (MARTA) Annual Meeting, Lawrenceville, NJ, USA, October 2016
71. **(Analytical Chemistry Young Innovator Award Lectureship) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, microTAS2016, Dublin, Ireland, October, 2016
72. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Organ-on-a-chip Workshop, University of Hong Kong, Hong Kong, October 2016
73. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The National Toxicology Program Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM), Bethesda, MD, USA, September 2016
74. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Reproductive Sciences Seminar (RSS) Series, University of Colorado School of Medicine, Denver, USA, May 2016
75. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, High-Content & Phenotypic Screening, Cambridge, UK, May 2016
76. **(Keynote lecture) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Microtechnologies in Medicine and Biology (MMB), Seoul, Korea, April 2016
77. ***Microengineered physiological pulmonary models***, New Developments in *In Vitro* Models of the Pulmonary Epithelium, European Respiratory Society (ERS), Berlin, Germany, April 2016
78. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The Placental Association of the Americas Annual Symposium, Montreal, Canada, March 2016
79. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Pittcon 2016, Atlanta, GA, USA, March 2016
80. ***Microengineered Human Organs-on-Chips for Toxicology Research***, Workshop on Alternative Methods in Inhalation Toxicology, The Society of Toxicology (SOT) Annual Meeting, New Orleans, LA, USA, March 2016

81. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, CE Advanced Course, The Society of Toxicology (SOT) Annual Meeting, New Orleans, LA, USA, March 2016
82. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Mother Infant Research Institute (MIRI), Tufts University School of Medicine, Boston, MA, USA, November 2015
83. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Chemical and Petroleum Engineering, University of Kansas, Lawrence, KS, USA, November 2015
84. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Pharmacology and Physiology, Drexel University College of Medicine, Philadelphia, PA, USA, November 2015
85. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Bio and Brain Engineering, KAIST, Daejeon, Korea, October 2015
86. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, 3D Cell Culture: Organoid, Spheroid, and Organ-on-a-Chip Models, Boston, MA, USA, November 2015
87. **Organs-on-Chips and microphysiological systems**, MicroTAS2015, Gyeongju, Korea, October 2015
88. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, US-Korea Conference on Science, Technology and Entrepreneurship 2015 (UKC 2015), Atlanta, GA, USA, July 2015
89. **(Plenary lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Inflammation at Barrier Surfaces: From Bench to Bedside, McGill University, Montreal, Canada, June 2015
90. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, 10th Anniversary Symposium, Center of Excellence in Environmental Toxicology, Philadelphia, PA, USA, May 2015
91. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Digestive Disease Week (DDW) 2015 Meeting, Washington, DC, USA, May 2015
92. **Microengineered Bio-mimicry of Human Organs**, TEDxLMSD, Ardmore, PA, USA, May 2015
93. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Mechanical Engineering, University of California, Santa Barbara, CA, USA, April 2015
94. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Chemical Engineering, Columbia University, New York, NY, USA, April 2015
95. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Penn Fibrosis Symposium, University of Pennsylvania, Philadelphia, PA, USA, April 2015
96. **Microengineered Bio-mimicry of Human Organs**, TEDxPenn, Philadelphia, PA, USA, April 2015
97. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Pharmacology and Toxicology, Rutgers University, Piscataway, NJ, USA, March 2015
98. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, American Association of Anatomists (AAA) Annual Meeting, Boston, MA, USA, March 2015
99. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Department of Biomedical Engineering, New Jersey Institute of Technology, Newark, NJ, USA, March 2015
100. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The Society of Toxicology (SOT) Annual Meeting, San Diego, CA, USA, March 2015
101. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Penn LAM Symposium, Airways Biology Initiative, University of Pennsylvania, PA, USA, February 2015
102. **(Plenary lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The 4th International Conference on Additive Manufacturing and Bio-Manufacturing, Beijing, China, November 2014
103. **(Plenary lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The 13th Biennial International Endotoxin and Innate Immune Society (IEIIS) Meeting, Salt Lake City, UT, USA, October 2014
104. **Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, Schepens Eye Institute, Harvard Medical School, Boston, MA, USA, October 2014
105. **Microengineered Physiological Bio-mimicry for Pulmonary Research**, European Respiratory Society International Congress 2014, Munich, Germany, September 2014
106. **(Keynote lecture) Microengineered Physiological Bio-mimicry; Human Organs-on-Chips**, The 7th World Congress in Biomechanics, Boston, MA, USA, July 2014

107. ***Microengineered Physiological Bio-mimicry for Lung Research***, Thomas L. Petty Aspen Lung Conference, Aspen, CO, USA, June 2014
108. **(Keynote lecture) *Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Horizons in Human Cells: At the interface of science, engineering, medicine & society, University of Edinburgh, Scotland, May 2014
109. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, 13th Annual World Pharma Congress, Boston, MA, USA, May 2014
110. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Center for Research on Reproduction and Women's Health, University of Pennsylvania, PA, USA, February 2014
111. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Institute for Medicine and Engineering Seminar Series, University of Pennsylvania, PA, USA, November 2013
112. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Pulmonary, Allergy, and Critical Care Division Research Conference, University of Pennsylvania, PA, USA, November 2013
113. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, 8th Cell Based Assay & Screening Technologies Conference, San Francisco, CA, USA, November 2013
114. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA, November 2013
115. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Scheie Eye Institute, University of Pennsylvania, PA, USA, October 2013
116. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering, Texas Tech University, TX, USA, October 2013
117. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, International Symposium on Grand Challenges for the Integration of Stem cells, Nanomaterials, and Biomanufacturing, Chinese Academy of Sciences, Shanghai, China, June 2013
118. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, 2013 Innovative Research Institute for Cell Therapy Spring Symposium, Seoul, Korea, May 2013
119. **(Plenary lecture) *Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, The 33rd Annual Conference of the Korean Society of Critical Care Medicine, Seoul, Korea, April 2013
120. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Pathology, Samsung Medical Center, Seoul, Korea, April 2013
121. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Chemical and Biological Engineering, Seoul National University, Seoul, Korea, March 2013
122. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Internal Medicine, Asan Medical Center, Seoul, Korea, March 2013
123. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Dermatology, Seoul National University Hospital, Seoul, Korea, March 2013
124. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, The 13th Annual International Proteomics Conference, Seoul, Korea, March 2013
125. ***A Human Breathing Lung-on-a-chip***, The 2013 FSU Life Sciences Symposium: Modeling Human Disease, College of Medicine, Florida State University, Tallahassee, FL, USA, February 2013
126. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Electronics and Telecommunications Research Institute, Seoul, Korea, February 2013
127. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Division of Pulmonary and Critical Care Medicine, Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea, February 2013
128. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Anesthesiology, Seoul National University Hospital, Seoul, Korea, January 2013
129. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Division of Nephrology, Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea, November 2012
130. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, The Annual Meeting of the Korean Society of Mechanical Engineering, Changwon, Korea, November 2012

131. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Biotronics 2012: International Conference on Biosensors, Biochips, and Bioelectronic Devices, Gwangju, Korea, October 2012
132. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Nano Korea: International Symposium on Nanotechnology, Seoul, Korea, July 2012
133. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Society for Laboratory Automation and Screening in Asia, Shanghai, China, June 2012
134. ***How can we model the complex alveolar microenvironment?*** American Thoracic Society, San Francisco, CA, USA, May 2012
135. ***A Human Breathing Lung-on-a-chip***, The 2012 Annual Spring Meeting of The Korean Biochip Society, Korea, May 2012
136. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering, Sogang University, Seoul, Korea, April 2012
137. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Korea Institute of Science and Technology, Seoul, Korea, March 2012
138. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, Korea, March 2012
139. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering, Stanford University, Stanford, CA, USA, February 2012
140. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Society for Laboratory Automation and Screening, San Diego, CA, USA, February 2012
141. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Biomedical Engineering, Boston University, Boston, MA, USA, February 2012
142. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Institute for Environmental Medicine, University of Pennsylvania School of Medicine, Philadelphia, PA, USA, January 2012
143. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, USA, January 2012
144. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, USA, January 2012
145. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Biomedical Engineering, Carnegie Mellon University, Pittsburg, PA, USA, November 2011
146. ***(Plenary lecture) A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Annual Merck Research Laboratories Respiratory Symposium, Boston, MA, USA, November 2011
147. ***(Plenary lecture) A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, International Society for the Study of Xenobiotics, Atlanta, GA, USA, October 2011
148. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Stem Cells and Cell Therapies in Lung Biology and Lung Diseases, Burlington, VT, USA, July 2011
149. ***A Human Breathing Lung-on-a-chip***, American Thoracic Society, Denver, CO, USA, April 2011
150. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering Seminar, MIT, Boston, MA, USA, March 2011
151. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Bioengineering Seminar, University of California, Berkeley, CA, USA, February 2011
152. ***A Human Breathing Lung-on-a-chip***, Watching the Lung Work, Germany, September 2010
153. ***A Human Breathing Lung-on-a-chip***, World Congress of Biomechanics, Singapore, August 2010

TEACHING

University of Pennsylvania

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|---------|--|
| BE350 | Introduction to Biotransport Processes |
| BE551 | Biomechanics |
| BE490 | Research in Bioengineering |
| CAMB703 | The ECM, Adhesion Receptor Signaling, and Translational Biomechanics |

Seoul National University

BME461.625 Biological Micro-Electro-Mechanical Systems (BioMEMS)
 BME461.619 Special Topics in Biomedical Engineering
 M801.135 Introduction to Bioengineering

Harvard University

CB399 Microfluidics Nanocourse

ADVISEES

Research Associates & Postdocs:

Jungwook Paek, Ph.D. (Postdoctoral Fellow)
 Haijiao Liu, Ph.D. (Postdoctoral Fellow)
 Sezin Aday Aydin (Postdoctoral Fellow)

Ju Young Park (Postdoctoral Fellow)
 Mousa Younesi (Postdoctoral Fellow)
 Pouria Fattahi (Postdoctoral Fellow)

Graduate students:

Andrei Georgescu (PhD candidate in Bioengineering)
 Estelle Park (PhD candidate in Bioengineering)

Rachel Young (PhD candidate in Bioengineering)
 Jeehan Chang (PhD candidate in Bioengineering)
 Jiayue Li (MS candidate in Bioengineering)

Full-time research technicians:

Toren Arginteanu

Undergraduate students:

Samira Mehta (Vagelos Scholars Program in the Molecular Life Sciences)

Shawn Kang (Bioengineering)

Former advisees:

Postdocs

Name	Year in the lab	Current position
Mark Mondrinos	2014 – 2019	Assistant Professor of BME at Tulane University
Keon Woo Kwon	2015 – 2019	Research Scientist at DJ Pharmaceuticals
Nicole Qiaozhi Lu	2017 – 2018	Research Scientist at Johnson & Johnson
Minseon Cho	2015 – 2017	Research Scientist at Tavotek Biotherapeutics

Ph.D.

Name	Graduation	Degree	Current position
Jeongyun Seo	2020	PhD in BE	
Cassidy Blundell	2018	PhD in BE	Bioinnovations Capital Boston

Masters

Name	Graduation	Degree	Current position
Jessica Schwartz	2020	MS in BE	Medical school student in Hofstra
Aidi Liu	2020	MS in BE	PhD student in BME at Rice Univ
Jonathan Song	2017	MS in BE	PhD student in BME at Northwestern
Emily Tess	2017	MS in BE	ClearView Healthcare Partners
Summer Ding	2016	MS in BE	
Nan-Kun Wu	2015	MS in BE	United Biomedical Inc
David Conegliano	2015	MS in BE	Emulate Inc
Sonwook Kwon	2014	MS in BE	Simens Healthcare

Technicians

Name	Year in the lab	Current position
Jeong Min Oh	2018 – 2019	PhD student in BE at USC
Yoon-Suk Yi	2016 – 2020	Engineer at Tara Biosystems

Dissertation committee member for

Name	Advisor	Graduation	Thesis title
Adam Suppes	D. Hammer		
Erin Purvis	K. Cullen		
Lauren Beck	A. Raj	2021 (expected)	Establishing an imaging-based methodology to systematically measure design principles of organoid systems
Sohaib Hashimi	R. Heuckeroth	2020 (expected)	Role of ATCG2 mutations in visceral myopathy
Minna Chen	J. Burdick	2019	Cell delivery to the heart with injectable hyaluronic acid hydrogels for improved vascularization
Nicholas Anderson	D. Hammer	2019	The biophysics of leukocyte adhesion deficiency”, Ph.D. in Chemical and Biomolecular Engineering
Steven Henry	D. Hammer	2015	Biophysics of human neutrophil haptokinesis
Su Chin Heo	R. Mauck	2015	Differentiation induces dynamic alterations in mesenchymal stem cell nuclear architecture and mechanotransduction

Undergraduates

Nicole Chiou (Bioengineering), 2019-2020
Sue-Yun Lee (Bioengineering), 2019
Sanjana Vasudevan (Bioengineering), 2018-2020
Lucas Almada-Sabate (Bioengineering), 2018-2019
Matthew Osborn (Vagelos Scholars Program in the Molecular Life Sciences), 2016-2019
Sanjana Vasudevan (Bioengineering), 2017-2020
Dominic Demma (CEMB REU student from UIUC), 2018
Thomas Seykora (Biology, graduated on 5/2017), 2016-2017
Aaman Mengis (CEMB REU student from the University of Maryland), 2017
Kush Mehta, Carla Winter, Vahid Hoshmand, Elizabeth Hwang (Bioengineering), 2016
Woo Yul Byun (Bioengineering, graduated on 5/2017), 2015-2017
Stephanie Mark (Bioengineering, graduated on 5/2016), 2015-2016
Joshua Ng (Bioengineering, graduated on 5/2016), 2014-2015
Jesi Kim, Amy Lee, Amy Keech, Nina Zhu (Bioengineering, graduated on 5/2015)
Kevin Emancipator (Bioengineering), 2013-2014
Brian Nam (Bioengineering), 2013-2014

High school students

Ho Hyun Jeon (summer intern from Chadwick International School), 2019 (current at WashU)
Hailey Chang (summer intern from Choate Rosemary Hall), 2017 (currently at Northwestern)
Parth Mody (summer intern from Choate Rosemary Hall), 2018 (currently at Penn)

Visiting scholars

Young Jae Cho, M.D. (Visiting Professor, Clinical Associate Professor, Division of Pulmonary and Critical Care Medicine, Seoul National University Hospital, Korea)
Chul Ho Chang, M.D., Ph.D. (Associate Professor of Anesthesiology and Pain Medicine, College of Medicine, Yonsei University, Korea; 2013-2015)
Sun Min Kim, Ph.D. (Associate Professor of Mechanical Engineering, Inha University, Korea; 2013-2014)

DEPARTMENT SERVICE

2016-2018 Bioengineering faculty search committee
2014-2016 Instructor and course manager for undergraduate independent research (BE490)

OUTREACH ACTIVITIES

2019 Speaker for Science Café: The Black Sheep Pub
2019 Human organs and bioengineering, The Canadian International School in Singapore
2018 Philadelphia Science Festival (Be a Penovator)
2015-2019 Junior BETA Day
2015 TEDxLMSD (Lower Merion School District) invited speaker

PROFESSIONAL ACTIVITIES

Grant reviews:

2020 NIH/NIBIB study section (ad hoc)
2020 Samsung Research Funding for Future Technology
2019 Samsung Research Funding for Future Technology
2018 NIH NIDDK HIRN New Investigator Award (ad hoc)
2018 Samsung Research Funding for Future Technology
2016 NIH Special Emphasis Review Meeting (ad hoc)
2016 NIH NIBIB study section (ad hoc)
2016 NIH NIDDK Diabetes Complications Consortium (ad hoc)
2016 National Research Foundation of Korea
2016 Samsung Research Funding for Future Technology
2015 The Austrian Science Funds
2015 The Lord Dowding Fund for Humane Research
2014 NIH NIDDK study section (ad hoc)
2014 Air Force Office of Scientific Research
2014 Severo Ochoa Programme, Spanish National Agency for Scientific Evaluation (ANEP)
2013 Agency for Science, Research & Technology (A*STAR), Singapore

Technical meeting activities:

2020 Advisory Committee, NCATS/HESI MPS Annual Meetings
2019 Session Chair, Biomedical Engineering Society (BMES) Annual Meeting
2018 Chair, 2018 Microtechnologies in Medicine and Biology (MMB)
2018 Session Chair, 2018 Annual AAAS Meeting
2017 Session Organizer and Chair, 2017 Society for Laboratory Automation and Screening (SLAS) Meeting
2016 Session Organizer and Chair, 2016 Society of Toxicology (SOT) Annual Meeting
2016 Session Chair, Nanoengineering for Medicine and Biology (NEMB)
2015 Session Organizer and Chair, 2015 US-Korea Conference on Science, Technology, and Entrepreneurship
2015 Session Organizer and Chair, 2015 Society of Toxicology (SOT) Annual Meeting
2015 Session Chair, 2015 TERMIS World Congress
2015 Session Chair, Biomedical Engineering Society (BMES) Annual Meeting
2015 Track Chair for Micro/Nano Technologies Track, 2015 Society for Lab Automation and Screening (SLAS) Meeting

- 2014 Session Organizer and Chair, 2014 Society for Leukocyte Biology (SLB)-International Endotoxin and Innate Immunity Society (IEIIS) Meeting
- 2014 Associate Track Chair for Micro/Nano Technologies Track, 2014 Society for Lab Automation and Screening (SLAS) Meeting
- 2014 Session Chair, The 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society
- 2013 Session Chair, The 47th Korean Society of Medical & Biological Engineering Annual Meeting
- 2012 Session Chair, Biomedical Engineering Society (BMES) Annual Meeting
- 2012 Session Organizer and Chair, 2012 Society for Laboratory Automation and Screening (SLAS) Meeting

Editorial activities:

- 2019 Guest Editor, *APL Bioengineering*
- 2017-present Associate Editor-in-Chief, *Microphysiological Systems*
- 2014 Guest Associate Editor, *Journal of Laboratory Automation*
- 2013-present Editorial Board Member, *Journal of Biotechnology & Biomaterials*
- 2013-present Editorial Board Member, *Journal of Analytical & Molecular Techniques*

STARTUP ACTIVITIES

- 2020-present Founder, VivoDyne Inc.
- 2014-present Scientific Advisory Board Member & Consultant, Emulate Inc.
- 2018-present Consultant, Sanguis Inc.

JOURNAL REVIEWS

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|--------------------------------|--|
| Science | Tissue Engineering |
| Nature | PLOS ONE |
| Nature Biotechnology | Journal of Microelectromechanical Systems |
| Nature Communications | Journal of Micromechanics and Microengineering |
| Nature Methods | Molecular Biology of the Cell |
| Nature Biomedical Engineering | Nanomedicine |
| Science Advances | Journal of Nanoscience and Nanotechnology |
| Science Translational Medicine | Biomedical Microdevices |
| PNAS | Biomedical Engineering Letters |
| Cell reports | International Journal of Precision Engineering and Manufacturing |
| Lab on a Chip | Microfluidics and Nanofluidics |
| Biomicrofluidics | Experimental Biology and Medicine |
| Scientific Reports | Biomaterials Science |
| Applied Physics Letters | Biotechnology Journal |
| Advanced Functional Materials | Advanced Science |
| Advanced Healthcare Materials | |