DAN HUH

Bioengineer

J. Peter Skirkanich Professor of Bioengineering
Chair, Bioengineering Graduate Group
Director, MORPH Lab
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Training + Experience

Seoul National University
B.S. in Mechanical Engineering
1994-2000

University of Michigan
Ph.D. in Biomedical Engineering
2004-2007
M.S. in Biomedical Engineering
M.S. in Mechanical Engineering
2000-2002
Advisor: Prof. Shuichi Takayama

Harvard Medical School
Children's Hospital Boston
Postdoctoral Fellow
2007-2009
Advisor: Prof. Donald Ingber

Harvard University
Wyss Institute
Wyss Technology Development Fellow
Research Associate
2009-2012
Advisor: Prof. Donald Ingber

Seoul National University
College of Medicine
Department of Biomedical Engineering
Assistant Professor
2012-2013

University of Pennsylvania
Department of Bioengineering
Wilf Family Term Assistant
Professor (2013-2019)

University of Pennsylvania
Department of Bioengineering
Associate Professor (2019-2024)

University of Pennsylvania
Department of Bioengineering
Professor (2024-2026)

University of Pennsylvania
J. Peter Skirkanich Professor of
Innovation (2026-present)

Chair, Bioengineering Graduate
Group (2026-present)

Penn Institute for Regenerative Medicine (IRM)
Member (2013-present)

Museum of Modern Art (MOMA)
Registered Artist & Lifetime
Member (2015-present)

Center for Engineering Mechanobiology (CEMB)
Member (2016-present)

Penn Center for Innovation & Precision Dentistry (CiPD)
Member (2021-present)

THE HUH LABORATORY

WE ARE

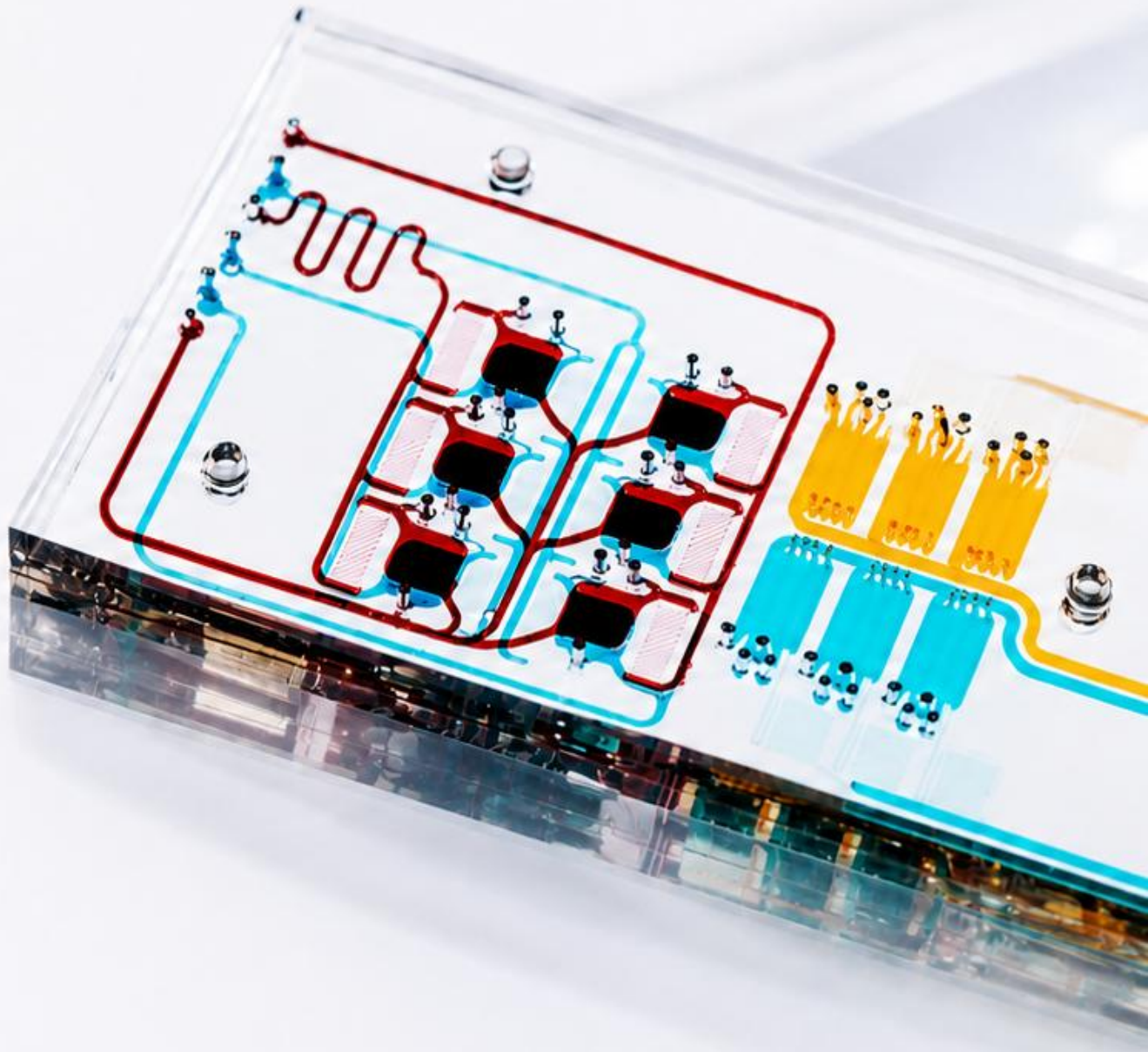
an interdisciplinary research group, also known as the **MORPH Lab**, with the mission of transforming the technological foundation of how we model human health and disease in biomedical research.

WE DEVELOP

new engineering design principles and experimental platforms to advance the frontiers of **complex in vitro models** and **new approach methodologies (NAMs)**.

WE ARE COMMITTED

to evolving laboratory models of healthy and diseased human tissues into **automated data engines** and **computational intelligence** for the advancement of life science and technology.



AWARDs + HONORs

Inventor of the Year Award
Penn Center for Innovation (2022)

Lush Prize
(with £50,000 prize fund) (2018)

Technology Impact Award
Cancer Research Institute (2017)

John J. Ryan Medal
Royal College of Surgeons in Ireland (2017)

Design of the Year Award
London Design Museum (2015)

Best Product Design of the Year
London Design Museum (2015)

TEDx Fellow (2015)

New England's Breakthrough Inventions and Inventors
Museum of Science & Boston Patent Law Association Technology (2013)

Wilf Family Endowed Chair
University of Pennsylvania (2013-19)

NC3Rs Annual Award
National Centre for the Replacement, Refinement, and Reduction of Animals in Research, London (2013)

J. Peter Skirkanich Professor of Innovation Endowed Chair
University of Pennsylvania (2026-present)

Chan Zuckerberg Initiative Award (2020)

Alice R. McPherson Distinguished Lectureship
University of Wisconsin, Madison (2018)

Bernard-Langer Distinguished Lectureship
University of Toronto (2019)

Analytical Chemistry Young Innovator Award
Analytical Chemistry & Chemical and Biological Microsystems Society (CBMS) (2016)

National Collegiate Inventors Competition ***Finalist*** (2015)

Lifetime Membership & Featured Designer
Museum of Modern Art (2015)

NIH Director's New Innovator Award
NIH (2014)

Best Paper Award
Korean Society of Medical & Biological Engineering (2012)

SLAS Innovation Award
Society for Lab Automation and Screening (2012)

PRIOR TO 2012

INDEX: Design for Life Award Finalist (2011)
Top 100 Science Stories of 2010, Discover Magazine (2011)
Scientific Breakthrough of the Year Award, 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 (2011)
Wyss Technology Development Fellowship, Harvard University (2009 – 2012)
Best Poster Award, Gordon Research Conference on Physics and Chemistry of Microfluidics (2007)
Best Talk of the Year Award, Microfluidics Interdisciplinary Seminar Series, University of Michigan (2007)
Best Poster Award, 2006 Engineering Symposium, University of Michigan (2006)
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 (2005)
Widmer Best Poster Award, microTAS (2004)

Representative publications

P Fattahi, M Younesi, WD Lee, K Whang, S Kim, T Kang, JD Rabinowitz, LM Aleksunes, DD Huh, "**A bioengineered model of human placental exposure to environmental metals during pregnancy**," in press, ***Nature Biomedical Engineering*** 2026 (**cover article**) https://doi.org/10.1038/s41551-026-01801-9.

H Liu, E Noguera-Ortega, X Dong, WD Lee, J Chang, S Aday Aydin, Y Li, Y Shin, X Shi, M Liousia, MC Martinez, JJ Brotman, S Kim, Z Chen, A Wang, Z Ou, Z Xiao, D Maria Racca, SJ Kim, GS Worthen, W Guo, E Pure, T Kang, JD Rabinowitz, EJ Wherry, E Pure, EK Moon, SM Albelda, DD Huh, "**A tumor-on-a-chip for in vitro study of CAR-T cell immunotherapy in solid tumors**," ***Nature Biotechnology*** 2026 (**cover article**), https://doi.org/10.1038/s41587-025-02845-z

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A Georgescu, JH Oved, J. Galarraga, T Cantrell, S Mehta, BM Dulmovits, TS Olsen, P Fattahi, A Wang, P Candarlioglu, A Muvaffak, MM Kim, J Seo, E Diffenderfer, A Lynch, GS Worthen*, DD Huh*, "**Self-assembled hematopoietic niche and emergent innate immunity on a chip**," ***Cell Stem Cell*** 2024, 31, P1847-1864, https://doi.org/10.1016/j.stem.2024.11.003.

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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 engineering of tissue anisotropy in microphysiological models of musculoskeletal tissue**," ***Science Advances*** 2021, 7, eabe9446, https://doi.org/10.1126/sciadv.abe9446.

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**," ***Nature Medicine*** 2019, 25, 1310-1318, https://doi.org/10.1038/s41591-019-0531-2.

SE Park, A Georgescu, D Huh, "**Organoids-on-a-chip**," ***Science*** 2019, 364, 960-965, https://doi.org/10.1126/science.aaw7894

E Esch, A Bahinski, D Huh, "**Organs-on-chips at the frontiers of drug discovery**," ***Nature Reviews Drug Discovery*** 2015, 14, 248-260, https://doi.org/10.1038/nrd4539

Representative publications PRIOR TO 2012

D Huh, BD Matthews, A Mammoto, M Montoya, HY Hsin, DE Ingber, "**Reconstituting organ-level lung functions on a chip**," ***Science*** 2010, 328, 1662-1668. https://DOI: 10.1126/science.1188302

D Huh, DC Leslie, BD Matthews, JP Fraser, S Jurek, GA Hamilton, KS Thorneloe, MA McAlexander, DE Ingber, "**A human disease model of drug toxicity-induced pulmonary edema in a lung-on-a-chip microdevice**," ***Science Translational Medicine*** 2012, 4, 1-8. http:// DOI: 10.1126/scitranslmed.3004249

D Huh, HJ Kim, JP Fraser, DE Shea, M Khan, A Bahinski, GA Hamilton, DE Ingber, "**Microfabrication of human organs-on-chips**," ***Nature Protocols*** 2013, 8, 2135-2157. https://doi.org/10.1038/nprot.2013.137

A Mammoto, KM Connor, T Mammoto, CW Yung, D Huh, CM Aderman, G Mostoslavsky, LEH Smith, DE Ingber, "**A mechanosensitive transcriptional mechanism that controls angiogenesis**," ***Nature*** 2009, 457, 1103-1111. https://doi.org/10.1038/nature07765

HJ Kim, D Huh, GA Hamilton, DE Ingber, "**Human gut-on-a-chip inhabited by microbial flora that experiences intestinal peristalsis-like motions and flow** ," ***Lab on a Chip*** 2012, https://doi.org/10.1039/C2LC40074J

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D Huh, KL Mills, X Zhu, MA Burns, MD Thouless, S Takayama, "**Tuneable Elastomeric Nanochannels for Nanofluidic Manipulation**," ***Nature Materials*** 2007**,** 6, 424-428. https://doi.org/10.1038/nmat1907

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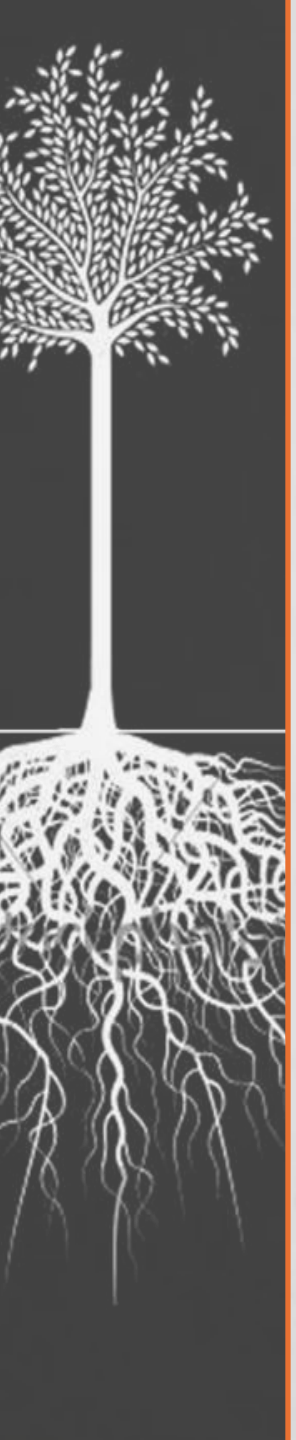


Full publication list

M Younesi, P Fattahi, Z Ren, WD Lee, S Cherry, H Koo, DD Huh, “**Emulating the gingival-tooth interface during bacterial, fungal, and viral infection in a microphysiological model of the human oral cavity**,” *submitted,* https://www.biorxiv.org/content/10.64898/2026.06.11.731421v1.

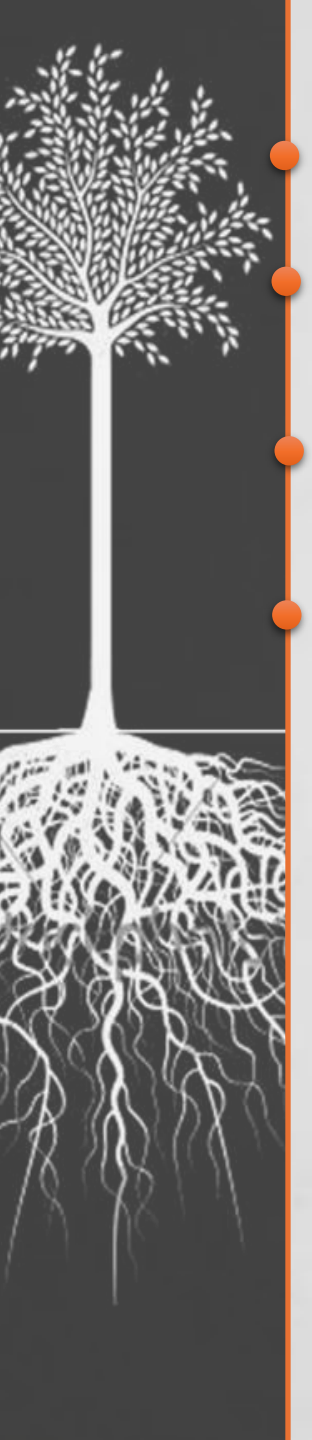
W Guo, Y Li, Y Lu, Z Qin, J Yang, Z Yu, J Chang, Q Xu, J Wang, Q Shi, Y Wan, S Liu, C Yang, J Wang, SA Aydin, EE Furth, AC Huang, Y Fan, J Kim, R Radhakrishnan, GL Beatty, SY Fuchs, X Xu, CH June, MJ Mitchell, DD Huh, W Zhong, "**Extracellular vesicle-mediated hepatic reprogramming orchestrates systemic tumor Immune suppression**,“ *Submitted*.

JY Park, C Blundell, S Aday-Aydin, AY Yi, N Signh, J Jang, JH Park, M Ahn, DW Cho, DD Huh, “**Multimodal engineering of functional living tissues with autonomous mechanical activity using naturally derived hydrogels**,” *submitted*.

SE Park, HI Edelstein, R Truitt, J Chang, H Liu, W Yang, D Stambolian, DD Huh, “**A bioengineered microphysiological model of the human retina-blood interface**,” *submitted*.

K Whang , J Min , Y Shin , Y Kim , J Lee , I Hwang , DD Huh , D Kim, T Kang, “**Real-time label-free selective and sensitive plasmonic detection of biological gas conversion of carbon monoxide in large-scale gas-liquid reactors**,” *submitted*.

J Wang, JD Unadkat, SLM Arnold1, JK Fallon, DD Huh, EJ Kelly, JB Tiley, H Zhu, R Rao, RM Stroud, KM Giacomini, LM Aleksunes, “**Advacing perinatal and pediatric science through the NIH Transporter Elucidation Network (TEN)**,” ***Clinical Pharmacology*** 2026, in press.



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H Liu, E Noguera-Ortega, X Dong, WD Lee, J Chang, S Aday Aydin, Y Li, Y Shin, X Shi, M Liousia, MC Martinez, JJ Brotman, S Kim, Z Chen, A Wang, Z Ou, Z Xiao, D Maria Racca, SJ Kim, GS Worthen, W Guo, E Pure, T Kang, JD Rabinowitz, EJ Wherry, E Pure, EK Moon, SM Albelda, DD Huh, "**Microengineered transplantation of human solid tumors for in vitro studies of CAR T immunotherapy**," ***Nature Biotechnology*** 2026 (**cover article**), https://doi.org/10.1038/s41587-025-02845-z

"**5 perspectives on translating microphysiological systems from concept to application**." ***Nature Communications*** 2026, **17**, 9148. https://doi.org/10.1038/s41467-026-77111-0

Z Zhang, Y-J Ho, X Fang, M Kim, M Li, W Luan, C Hinterleitner, S Haubner, F Kogel, E Pratt, E Ozcelik, J Reyes, Q Jiang, V W Yang, Y-J Chen, T Wang, H Liu, H Hu, X Zhuang, J Park, S Paffenholz, K Chen, Q Chang, A Kulick, J Zhang, E Chan, E Rosiek, R A Williams, A Wang, S Freeman, S Tian, G Gunset, A G Angus, N Lecomte, S Yeni Yildirim, E Ali, M Wu, I Miranda, C Antonescu, O Basturk, Z Tarcan, N Rekhtman, C Wilson, M Basar, J Sauter, H A Al-Ahmadie, S Singer, C Iacobuzio-Donahue, C Rudin, E de Stanchina, K Ganesh, P Romesser, B Weigelt, DD Huh, J Feucht, I Vazquez-Garcia, M J Bott, D Zamarin, S Shah, J Lewis, C Amor, D Pe'er, J Mansilla-Soto, A Filliol, M Sadelain, and S Lowe, **"A convergent uPAR-positive tumor ecosystem creates broad vulnerability to CAR T cell therapy,"** ***Cell*** 2026, https://doi.org/10.1016/j.cell.2026.03.002.

S Mani, S Kim, R Flock, DD Huh, M Mainigi, "**Microfluidic organ-on-chip device: a unique platform for investigating implantation and placentation**," in press, ***Fertility and Sterility*** 2025, https://doi.org/10.1016/j.fertnstert.2025.09.020

JA La, K Whang, H Lee, I Hwang, Y Kim, BH Choi, H Ko, HK Kim, DD Huh, D Kim, and T Kang, "**Facile Scalable Assembly of Uniform and Layered Plasmonic Hotspots by Force-assisted Capillary-mediated Colloidal Transfer for Maximizing Near-field Intensities,**" accepted for publication, ***Small*** 2025.

A Lang, E Eastburn, M Younesi, M Nijsure, C Siciliano, AP Haran, C Panebianco, E Seidl, R Tang, E Alsberg, NJ Willett, R Gottardi, DD Huh, JD Boerckel, "**Cyr61 delivery promotes angiogenesis during bone fracture repair**," ***npj Regenerative Medicine*** 2025, https://doi.org/10.1038/s41536-025-00398-y

MK Simoni, SG Negatu, JY Park, S Mani, MC Arreguin, K Amses, DD Huh, M Mainigi, KA Jurado, “**Type I interferon exposure of an implantation-on-a-chip device alters invasive extravillous trophoblast function**,” ***Cell Reports Medicine*** 2025, 6, 101991, https://doi.org/10.1016/j.xcrm.2025.101991

S Kim, N Guo, ZY Tan, X Gao, P Fattahi, H Liu, J Chang, M Younesi, S Jung, Y Chung, M Song, M Jung, DD Huh, “**A bioengineered model of the human cornea for preclinical assessment of human ocular exposure to environmental toxicants**,” ***Advanced Healthcare Materials*** 2025, https://doi.org/10.1002/adhm.202402408

A Georgescu, JH Oved, JH Galarraga, T Cantrell, S Mehta, BM Dulmovits, TS Olson, P Fattahi, A Wang, PL Candarlioglu, A Muvaffak, MM Kim, SA Aydin, J Seo, ES Diffenderfer, A Lynch, GS Worthen*, DD Huh*, “**Self-assembled hematopoietic niche and emergent innate immunity on a chip**,” ***Cell Stem Cell*** 2024, 31, P1847-1864, https://doi.org/10.1016/j.stem.2024.11.003

MP Lutolf, M Radisic, J Beekman, DD Huh, M Huch, MY Turco, Z Niloofar, T Birganim, D Gao, R Yao, H Lin, T Takebe, “**In vitro human cell-based models: What can they do and what are their limitations**,” ***Cell*** 2024 ,187, P4439-4443,

D Kozlosky, C Doherty, B Buckley, MJ Goedken, RK Miller, DD Huh, ES Barrett, LM Aleksunes, “**Fetoplacental disposition and cadmium toxicity in mice lacking the BCRP transporter**,” ***Toxicological Sciences*** 2024, 197, 132-146, https://doi.org/10.1093/toxsci/kfad115

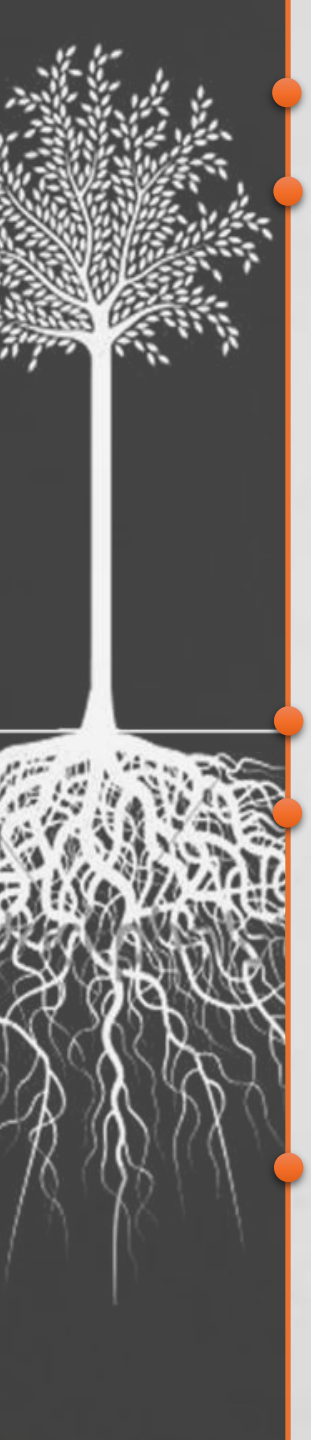
S Mani, J Garifallou, SJ Kim, MK Simoni, DD Huh, SM Gordon, M Mainigi, “**Uterine macrophages and NK cells exhibit population and gene-level changes after implantation but maintain pro-invasive properties**,” ***Frontiers in Immunology*** 2024, 15:1364036. https://doi.org/10.3389/fimmu.2024.1364036

J Kanter, SM Gordon, S Mani, A Sokalska, JY Park, S Senapati, DD Huh, M Mainigi, “**Hormonal stimulation reduces numbers and impairs function of human uterine natural killer cells during implantation**,” ***Human Reproduction*** 2023, 38, 1047-1059 https://doi.org/10.1093/humrep/dead069.

P Fattahi, YT Yeh, T Zhao, M Younesi, C Huang, M Terrones, S Zheng, JL Brown, DD Huh, S Zhang, PJ Butler, “**Endothelial cell selectivity to nanoparticles depends on mechanical phenotype**,” ***Advanced Materials Interfaces*** 2023, 10, 2300137, https://doi.org/10.1002/admi.202300137

MAU Khalid, KH Kim, ARC Salih, K Hyun, SH Park, B Kang, AM Soomro, M Ali, H Cho, Y Jun, DD Huh, KH Choi, “**High Performance Inkjet Printed Embedded Biosensors for Monitoring Hypoxia in Gut Bilayer Microfluidic Chip**,” ***Lab on a Chip*** 2022, 22, 1764, https://doi.org/10.1039/D1LC01079D.

C Sakolish, A Georgescu, DD Huh, I Rusyn, “**A model of human airway on a chip for studies of sub-acute effects of inhalation toxicants**,” ***Toxicological Sciences*** 2022, 26, 267, https://doi.org/10.1093/toxsci/kfac036.



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JY Park, S Mani, G. Clair, HM Olson, VL Paurus, CK Ansong, C Blundell, R Young, J Kanter, S Gordon, AY Yi, M Mainigi*, DD Huh*, "**A microphysiological model of human trophoblast invasion during early embryo implantation**," ***Nature Communications*** 2022, 13, 1252, https://doi.org/10.1038/s41467-022-28663-4.

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A Rahim C Salih, K Hyun, A Asif, AM Soomro, HMU Farooqi, Y Kim, KH Kim, J Lee, D Huh, KH Choi, "**Extracellular matrix optimization for enhanced physiological emulation on organ-on-a-chip**," ***Polymers*** 2021, 13, 3016,

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SE 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 Materials*** 2021, 13, 2. *co-corresponding authors

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*** 2021, doi.org/10.1002/smll.202004889.

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*** 2021, doi.org/10.1002/adfm.202007856. *co-corresponding authors

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**," ***Spectrochimica Acta A*** 2020, 226, 117610.

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.

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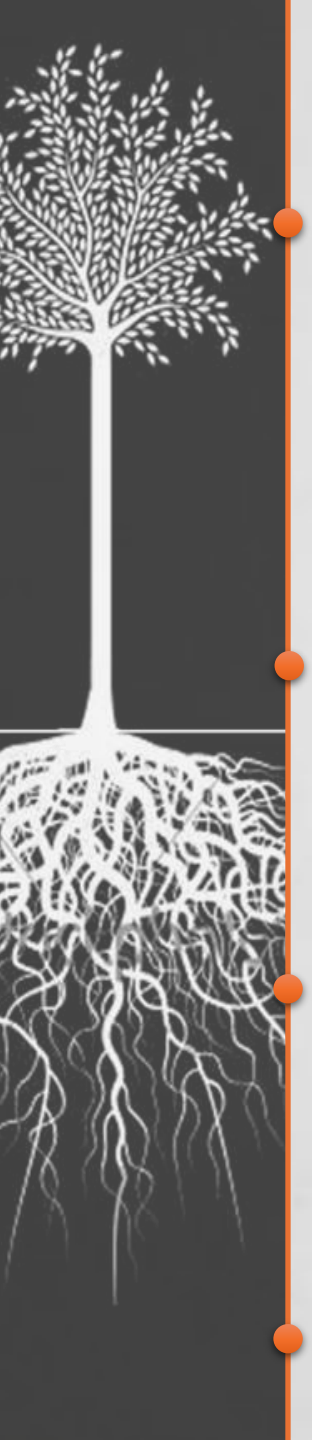

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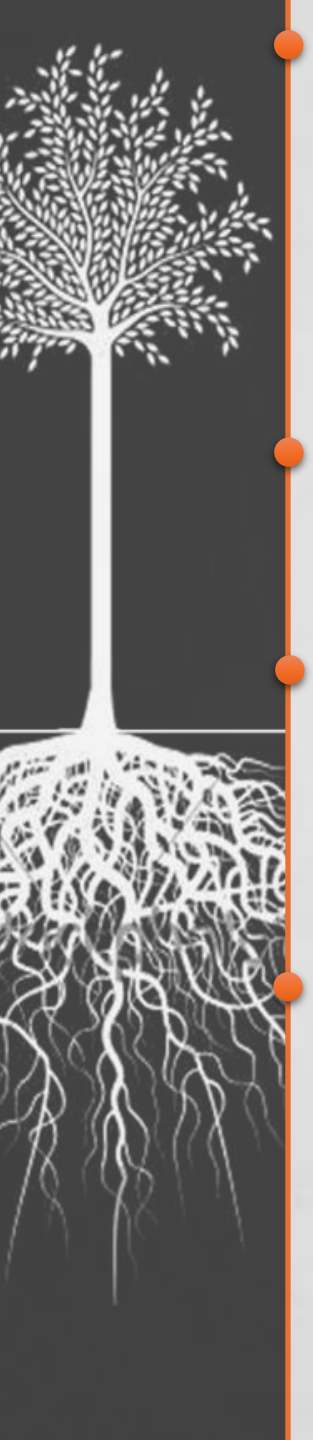

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48 ISSUED PATENTS

35 Issued patents from Penn and licensed to Vivodyne Inc.

13 Additional issued patents assigned to other organizations

10 Active applications

as of July 2026

Intellectual property

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N/A (Huh)
09/01/2020 – 01/31/28

Biomedical Advanced Research and Development Authority (BARDA): $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 imaging and multi-omics analysis towards the development of injury biomarkers and effective countermeasures.

N/A (Huh)
09/01/2025-02/28/2028

Gates Foundation: $350,000 direct/year

Human placenta-on-a-chip for preclinical screening of micronutrient supplements for preeclampsia

This project aims to harness the power of human placenta-on-a-chip technology developed in the Huh laboratory to model shallow maternal invasion of extravillous trophoblasts and their impaired ability to remodel maternal spiral arteries in preeclampsia. In the next phase of the project, the microengineered model of the preeclamptic maternal-fetal interface will be used for preclinical screening of micronutrient supplements designed for the treatment of preeclampsia.

Research funding active

1UC2HD113039-01 (Aleksunes, Huh, Zhu)
07/01/2023-06/30/2028

NIH/NIEHS: $749,800 direct/year

Integrated Transporter Elucidation Center

The Integrated Transporter Elucidation Center aims to deorphanize, profile, and evaluate the role of membrane transporters in the placental disposition of drugs, nutrients, and toxicants.

1R01EY036519-01 (Rohrer, Huh, Atkinson, Stambolian)
07/01/2024-04/30/2028

NIH/NEI: $794,658 direct/year

Assessment of the Complement Pathway in RPE/Choroid Tissue Chip

The proposed work aims to create a microengineered model of age-related macular degeneration (AMD) to investigate the effect of genetic risk factors and AMD-relevant stressors on disease progression and exacerbation.

N/A (Huh)
05/01/2022-04/30/2027

Ministry of Trade, Industry & Energy of the Republic of Korea: $98,000 direct/year

Development of 3D lung microphysiological platform for acute respiratory diseases

This study aims to develop a microengineered platform to mimic human lung tissues and screen respiratory toxicity of environmental materials.

2P50HD068157-11D1 (Bartolomei): 07/2024 - 06/2028

NIH/NICHD: $6,967,473 total

Penn Center for Study of Epigenetics in Reproduction

Project 1: We hypothesize that ART pregnancies with the greatest epigenetic disruption will be more likely to have adverse perinatal outcomes and be more likely to exhibit cardiometabolic changes during childhood, and that these disruptions will vary based on specific ART interventions. Project 3: In this project, we propose using two innovative in vitro models capable of quantifying changes in trophoblast function and epigenetic and transcriptomic perturbations, to carry out a thorough examination of the sex-specific impact of ART interventions on early pregnancy.

N/A (Shenoy): 10/01/2016-09/30/2026

National Science Foundation

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 (Simmons): 07/01/2026-06/30/2027

March of Dimes: $363,636 direct/year

March of Dimes Prematurity Research Center at the University of Pennsylvania

The March of Dimes has funded a prematurity research center at Penn since 2015. This year's proposal will fund three themes focused on extracellular vesicles in maternal circulation and maternal cervicovaginal metabolome in relation to preterm birth.

1R01CA288366-01 (Chen): 06/2024 - 05/2029

NIH/NCI: $1,858,595 total

Stromal Effects in Head and Neck Squamous Cell Carcinoma

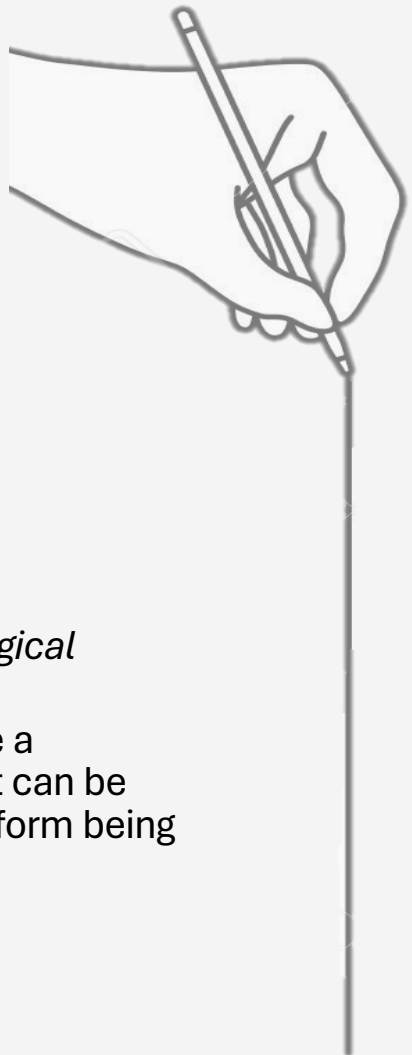
The findings of this proposal will reveal a stromal progenitor cell hierarchy in squamous cell carcinoma to provide a foundation for cancer organoid culture, high-throughput screening, personalized medicine, and biomarker identification in head and neck cancer. The long-term goal of this proposal is to develop an applicable model to achieve the cure of cancer.

Research funding active

Research funding completed
(chronological order)

N/A (Huh, Cotsarelis)
01/01/2015-12/31/2016
The Penn Institute for Regenerative Medicine: $100,000 direct/year
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)
07/01/2016 -06/30/2017
DARPA: $53,000 direct/year
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 (Huh)
06/30/2013-06/29/2017
National Research Foundation of Korea: $18,000 direct/year
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)
09/30/2015-09/29/2018
Department of the Army: $370,000 direct/year
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)
11/01/2014 -10/31/2019
March of Dimes
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.

Research funding completed

R01 HL126788 (Mangalmurti)
09/01/2015-08/31/2020
NIH/NHLBI: $284,000 direct/year
Role of RAGE and necroptosis in Transfusion Mediated Lung Inflammation

The major goal of this project is to understand the role of RAGE and necroptosis in lung Inflammation mediated by RBC transfusion.

N/A (Huh)
10/01/2017-2/28/2021
Penn Parker Institute for Cancer Immunotherapy:
$85,000 direct/year
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.

1UC4DK104196-01 (Stanger, Gadu, Zaret, Huh)
09/20/2014-06/30/2019
NIH/NIDDK: $928,000 direct/year
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 (Huh, Seale)
01/01/2016-12/31/2017
NIH/NIDDK (Role: PI): $236,000 direct/year
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 (Worthen, Huh)
06/30/2017-06/30/2018
Penn Institute for Immunology: $75,000 direct/year
Influenza infection in an autologous human airway-on-a-chip

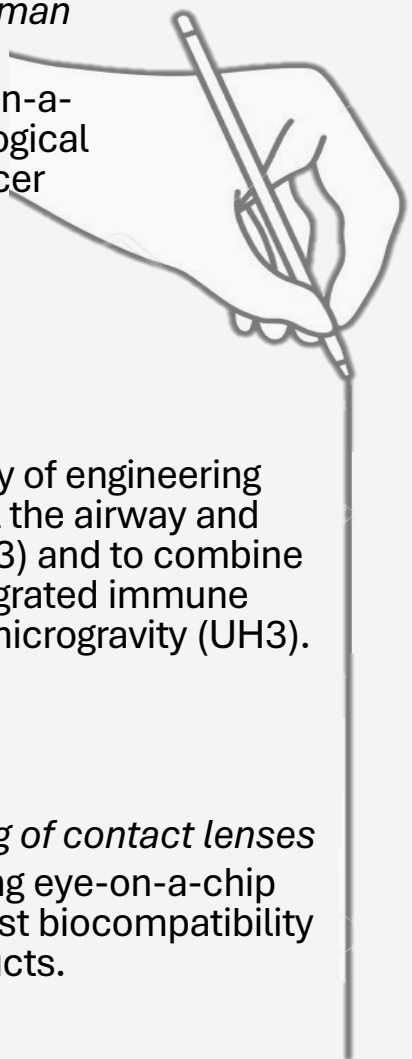
This project aims to develop a microengineered autologous model of the human airway device to test influenza.

N/A (Huh)
09/01/2016-8/31/31/2016
Alternatives Research & Development Foundation (ARDF):
$40,000 direct/year
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.

Research funding completed

N/A (Huh)
05/01/2021-06/30/2022
GSK: $172,754 direct/year
Probing drug-induced corneal pathology in a human blinking eye-on-a-chip
This project aims to use a human blinking eye-on-a-chip to reproduce and investigate pathophysiological alterations of the human cornea due to anticancer drugs developed by GSK.



1UG3TR002198-01 (Huh, Worthen)
09/01/2017 - 08/31/2022
NIH/NCATS/CASIS: $500,000 direct/year
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).

N/A (Huh, Bunya)
01/01/2020-8/31/2021
PCI: $50,000 direct/year
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.

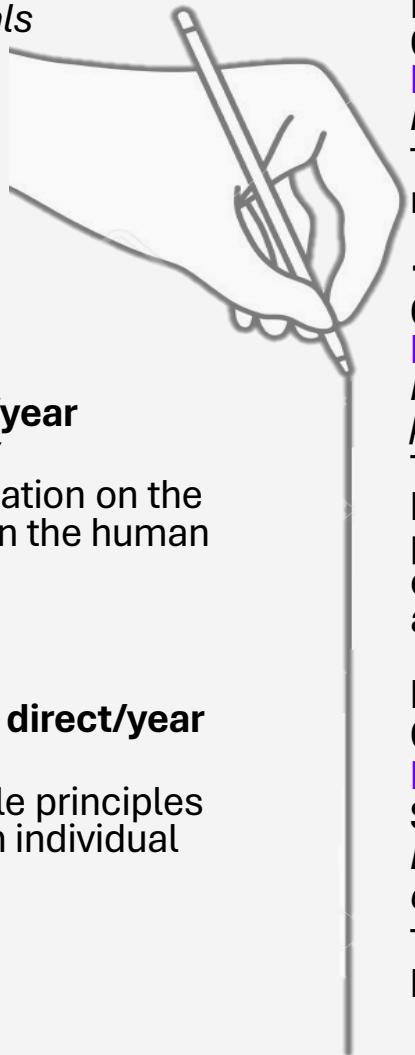
CRI Technology Impact Award (Huh)
09/01/2017-08/31/2021
Cancer Research Institute: $335,000 direct/year
A microengineered biomimetic model of tumor-immune cell interactions
This project aims to create a microengineered “cancer-on-a-chip” model using patient-derived cells to reconstitute vascularized 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.

N/A (Harty, Huh)
02/01/2020-01/31/2021
Penn Institute for Translational Medicine and Therapeutic: $15,000 direct/year
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.

1DP2HL127720 (Huh)
09/01/2014-08/31/2019
NIH Director’s New Innovator Award: $300,000 direct/year
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.

Research funding completed

1R01ES029275-01 (Aleksunes, Huh, Barrett)
09/01/2018-08/31/2023
NIH/NIEHS: $400,000 direct/year
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
Chan-Zuckerberg Initiative: $225,000 direct/year
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 (Meaney, Smith)
09/01/2017-12/31/2022
Paul G. Allen Family Foundation: $1,850,000 direct/year
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.

N/A (Huh)
10/01/2021-12/31/2022
Alcon: $173,909 direct/year
Testing ocular films in a human blinking eye-on-a-chip
This project aims to use a human blinking eye-on-a-chip to test engineered thin ocular films designed for the management of dry eye.

N/A (Huh)
02/26/2021-02/25/2023
Roche: Amount: $154,743 direct/year
Human blinking eye-on-a-chip for screening dry eye drugs
This project aims to use a human blinking eye-on-a-chip to test new dry eye therapies developed by Roche.

1R21EY031465-01 (Harty)
06/01/2020-05/31/2022
NIH/NEI: $234,000 direct/year
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 (Huh)
02/01/2019-05/31/2022
Ministry of Trade, Industry & Energy of the Republic of Korea:
$55,000 direct/year
Development of microphysiological systems for animal-free cosmetics testing
This study aims to develop a vascularized human skin model for high-content and animal-free screening of cosmetics.`

Research funding completed

1UG3DK122644-01 (Stanger, Huh, Gadu, Riley)
07/01/2019-06/30/2024

NIH/NIDDK: $749,261 direct/year
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.

N/A (Huh, Koo)
03/01/2023-02/28/2026

Colgate Palmolive Company: $300,000 direct/year
Study of L-Arginine impact on interkingdom biofilm development and tissue infection using mouth-on-a-chip technology

This work aims to use a microengineered model of the oral cavity containing human gingival tissues and analogs of tooth organ to investigate the efficacy and mechanisms of action of arginine combinations on biofilm development and oral infection.

N/A (Mainigi): 06/01/2022-03/31/2026

Burroughs Wellcome Funds: $500,000 direct/year
The role of estrogen metabolites in abnormal placentation

This project aims to investigate whether and how estrogen metabolites contribute to increased risk of preeclampsia following programmed frozen-thawed embryo-transfer.

Invited lectures

Microengineered biomimicry of human health and disease, 2027 American Society for Biochemistry and Molecular Biology (ASBMB) Annual Meeting, Boston, April 2027

Bioengineered mimicry of human health and disease, Cell Symposia: Advanced Models of Human Biology and Disease: From Organoids to NAMs, Bruges, Belgium, April 2027

230. ***Microengineered biomimicry of human health and disease,*** Astellas Pharma Inc., Tokyo, Japan, November 2026

Plenary: ***Bioengineered mimicry of human health and disease,*** The 41st Annual Meeting of the Japanese Society for the Study of Xenobiotics(JSSX), Tsukuba, Japan, November 2026

Microengineered biomimicry of human health and disease, Seminars in Development and the Pathogenesis of Disease, University of Kansas Medical Center, Kansas City, MO, November 2026

Plenary: ***Microengineered biomimicry of human health and disease,*** The Busan-Jinhae Free Economic Zone Center, Korea, October 2026

Bioengineered mimicry of human health and disease, Translational Research Seminar Series, Cellular and Molecular Biology Graduate Program, University of Michigan, Ann Arbor, MI, October 2026

Keynote: ***Microengineered biomimicry of human health and disease,*** 2026 K-BIGHEART International Symposium, POSTECH, Korea, October 2026

Microengineered biomimicry of human health and disease, Department of Electrical and Computer Engineering, Seoul National University, Korea, August 2026

Microengineered biomimicry of human health and disease, Integrative Materials Research Institute, Hallym University, Korea, July 2026

Microengineered biomimicry of human health and disease, Bio-Centennial Convergence Institute (BCCI), Yonsei University, Korea, July 2026

Plenary: ***Bioengineered mimicry of human health and disease,*** Next Generation Experimental Models, International Association for Laboratory Animal Science, Jeju, Korea, July 2026

220. ***Bioengineered mimicry of human health and disease,*** Seminars in Human Investigation, Thomas Jefferson University, Philadelphia, MA, May 2026

Bioengineered mimicry of human health and disease, MPS World Summit 2026, Washington DC, May 2026

Bioengineered mimicry of human health and disease, *Nature* Conference on Nanobiotechnology for Precision Medicine and Tissue Engineering, Tel Aviv, Isarel, May 2026

Bioengineered mimicry of human health and disease, Tufts University 2026 Engineering for Women's Health Symposium, Medford, MA, March 2026

Bioengineered mimicry of human health and disease, Department of Biological Engineering, MIT, Boston, MA, March 2026

Keynote: ***Bioengineered mimicry of human health and disease,*** The Japanese Moonshot Research and Development Program, Kyushu University, Japan, February 2026

Microengineered biomimicry of human physiological systems, EMBL Meeting - The new cardiobiology: engineering, vascular and molecular insights, Heidelberg, Germany, February 2026

Microengineered biomimicry of human health and disease, Predictive Immunotoxicology: Enabling the Development of Safe (Bio)Materials, US Army Research Office, January 2026

Keynote: ***Organoids-on-a-chip,*** MINeD TEC Organoid Symposium, Johns Hopkins University, Baltimore, MD, January 2026

Three questions to ponder: defining our path of innovation in complex in vitro models, Tissue Talks (virtual), October 2025

210. ***Microengineered biomimicry of human physiological systems,*** Institute of Quantum Biophysics Colloquium, Sungkyunkwan University, Korea, September 2025

Microengineered biomimicry of human physiological systems, Department of Biological Engineering, Inha University, Korea, July 2025

Keynote: ***Microengineered biomimicry of human physiological systems,*** NanoKorea Annual Meeting, Seoul, Korea, July 2025

Bioengineered models of the maternal-fetal interface in the human placenta, NIH Transporter Elucidation Network Meeting, April 2025

Keynote: ***Bioengineered models of the maternal-fetal interface in the human placenta,*** Human Placenta Health Project Workshop, Gates Foundation, Seattle, WA, April 2025

Keynote: ***Microengineered biomimicry of human physiological systems,*** RIKEN BDR Symposium: Towards redesigning lifecycles, Kobe, Japan, March 2025

Keynote: ***Microengineered biomimicry of human physiological systems,*** Annual Research Retreat, Omenn-Darling Bioengineering Institute, Princeton University, Princeton, NJ, November 2024

Keynote: ***Microengineered biomimicry of human physiological systems,*** Annual Retreat, Center for Stem Cell & Organoid Medicine (CuSTOM), University of Cincinnati, Cincinnati, OH, November 2024

Microengineered biomimicry of human physiological systems, Stowers Institute for Medical Research, Kansas City, MO, November 2024

Microengineered biomimicry of human physiological systems, The 8th Bioengineering and Translational Medicine Conference, Society for Biological Engineering, AIChE, San Diego, CA, October 2024

200. Keynote: ***Microengineered biomimicry of human physiological systems,*** 2024 II 3Rs Day – Models in Biomedical Research, i3S Institute, Porto, Portugal, October 2024

Keynote: ***Microengineered biomimicry of human physiological systems,*** 2024 MicroTAS, Montreal, Canada, October 2024

Microengineered biomimicry of human physiological systems, Cell Symposium – Engineering Development and Disease in Organoids, San Diego, USA, August 2024

Keynote: ***Microengineered biomimicry of human physiological systems,*** 2024 European Organ-on-Chip Society (EUROoCS) Meeting, Milan, Italy, July 2024

Keynote: ***Microengineered biomimicry of human physiological systems,*** 2024 Genetic Toxicology Association (GTA) Annual Meeting, Newark, USA, April 2024

Microengineered biomimicry of human physiological systems, Human Islet Research Network Meeting, Virtual, February 2024

Keynote: ***Microengineered biomimicry of human physiological systems,*** 2024 KASBP-SF Annual Symposium, San Francisco, USA, January 2024

Keynote: ***Microengineered platforms for organoid research,*** Biofusion Seminar 2023 – Organoids and Organ-on-Chip, Seoul, December 2023

Microengineered biomimicry of human physiological systems, 2023 AiChE Annual Meeting, Orlando, USA, November 2023

Microengineered biomimicry of human physiological systems for space research, Korea Advanced Institute of Science and Technology (KAIST), Korea, October 2023

190. **Keynote:** ***Microengineered biomimicry of human physiological systems,*** 2023 BMES Annual Meeting, Seattle, USA, October 2023

Keynote: ***Microengineered biomimicry of human physiological systems,*** Annual Meeting for the Korean Society for Biotechnology and Bioengineering, Busan, Korea, October 2023

Keynote: ***Microengineered biomimicry of human physiological systems,*** 2023 Korea Advanced Alternative Test Conference, Oh-song, Korea, September 2023

Microengineered biomimicry of human physiological systems, The Catholic University of Korea, August 2023

Microengineered biomimicry of human physiological systems, Department of Mechanical Engineering, Sogang University, August 2023

Keynote: ***Microengineered biomimicry of human physiological systems,*** 13th Annual Hands-On Workshop in 3D-Printing & Microfluidics for Bioengineering Applications, McGill University, Montreal, Canada, May 2023

Microengineered biomimicry of human physiological systems, Center for Translational Stem Cell Biology, Hong Kong University of Science and Technology, May 2023

Microengineered biomimicry of human physiological systems, Department of Biomedical Engineering, Johns Hopkins University, MD, USA, April 2023

Microengineered biomimicry of human physiological systems, IRM Faculty Lunch, University of Pennsylvania, PA, USA, April 2023

Microengineered biomimicry of human physiological systems, Department of Biophysics, Sungkyunkwan University, Seoul, Korea, January 2023

180. **Plenary:** ***Microengineered biomimicry of human physiological systems,*** Biofusion Seminar 2022 – Organoids and Organ-on-Chip, Seoul, December 2022

Microengineered biomimicry of human physiological systems, Department of Chemical and Biomolecular Engineering, Sogang University, November 2022

Microengineered biomimicry of human physiological systems, Tissue Talk, October 2022

Microengineered biomimicry of human physiological systems, Roche, October 2022

Microengineered biomimicry of human physiological systems, Department of Microbiology, Choongbuk National University, August 2022

Microengineered biomimicry of human physiological systems, Department of Chemical Engineering, Jeonbuk National University, August 2022

Plenary: ***Microengineered biomimicry of human physiological systems,*** The 6th Annual Symposium, OK-MPS Validation Center, Ohsong, Korea, July 2022

Microengineered biomimicry of human physiological systems, The Skirball Institute Seminar, NYU School of Medicine, New York, May 2022

Microengineered biomimicry of human physiological systems, Society of Toxicology (SOT) FutureTox V: New Technologies to Evaluate Organ-Specific Effects of Drugs and Chemicals, UNC, Chapel Hill, May 2022

Microengineered biomimicry of human physiological systems, 11th Annual Biomedical Engineering Symposium, McMaster University, Canada, March 2022

170. ***Microengineered biomimicry of human physiological systems,*** Organoids and Microfluidics in Cancer Research, Northwestern University, February 2022

Microengineered biomimicry of human physiological systems, The Sue & Bill Gross Stem Cell Research Center Annual Symposium, University of California, Irvine, January 2022

Microengineered biomimicry of human physiological systems, The Penn's Institute for Diabetes, Obesity, and Metabolism; the Division of Endocrinology, Diabetes, and Metabolism; and the Diabetes Research Center Seminar, January 2022

Keynote: ***Microengineered biomimicry of human physiological systems,*** The Berlin-Brandenburg School for Regenerative Therapies Symposium, November 2021

Microengineered biomimicry of human physiological systems, DOD/CDMRP-NIDCD Joint Workshop on Improving Ex-vivo Models to Accelerate Therapies to Treat Hearing Loss, November 2021

Microengineered biomimicry of human physiological systems, Department of Biomedical Engineering, Columbia University, October 2021

Microengineered biomimicry of human physiological systems, Stem Cell institute Seminar Series, University of Minnesota, October 2021

Microengineered biomimicry of human physiological systems, Next Generation Tissue Engineering, September 2021

Microengineered biomimicry of human physiological systems, Department of Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea, August 2021

Microengineered biomimicry of human physiological systems, Global Health Integrated Organoid Convening, Bill and Melinda Gates Foundation, July 2021

160. ***Microengineered biomimicry of human physiological systems,*** Pathology and Laboratory Medicine Grand Rounds, University of Pennsylvania, May 2021

Organs- and organoids-on-a-chip technology, Engineering Organoids and Organs, Cell Press Symposia, April 2021

How simple is complex enough? Engineering Organoids and Organs, Cell Press Symposia, April 2021

Microengineered Bio-mimicry of Human Physiological Systems, Korean Disease Control and Prevention Agency, April 2021

Microengineered Bio-mimicry of Human Physiological Systems, CPSS Science Talks, AstraZeneca, March 2021

Microengineered Bio-mimicry of Human Physiological Systems, Vascular Science Seminar Series, National Heart and Lung Institute, Imperial College London, February 2021

Keynote: ***Microengineered Bio-mimicry of Human Physiological Systems,*** IEEE EMBS Mini-Symposium on Micro & Nanotechnology in Medicine, December 2020

Microengineered Bio-mimicry of Human Physiological Systems, The Frontiers of Science Lecture, Penn School of Dental Medicine, Philadelphia, PA, November 2020

Keynote: ***Microengineered Bio-mimicry of Human Physiological Systems,*** Children's Healthcare of Atlanta's 19th annual Donald Schaffner Conference, Atlanta, GA, November 2020

Microengineered Bio-mimicry of Human Physiological Systems, American Society of Reproductive Medicine (ASRM) Virtual Meeting, October 2020

150. ***Microengineered models of reproductive organs,*** American Society of Reproductive Medicine (ASRM) Virtual Meeting, October 2020

Microengineered Bio-mimicry of Human Physiological Systems, Korean Society for Biotechnology and Bioengineering Annual Meeting, October 2020

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

Microengineered Bio-mimicry of Human Physiological Systems, SNUBH CAT-EBM Symposium, Seoul National University Bundang Hospital, Korea, September 2020

Microengineered Bio-mimicry of Human Physiological Systems, The 3rd NYU Biomedical and Biosystems Conference, Abu Dhabi, January 2020

Microengineered Bio-mimicry of Human Physiological Systems, GlaxoKlineSmith (GSK), Collegeville, PA, November 2019

Microengineered Bio-mimicry of Human Physiological Systems, Emulate Inc., Boston, MA, November 2019

Plenary: ***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

Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems, Department of Chemical Engineering, Sogang University, November 2019

Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems, NIH Tissue Chips & Biomaterials Workshop, NIH, MD, October 2019

140. ***Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems,*** Cold Spring Harbor Stem Cell Biology, Cold Spring Harbor, NY, September 2019

Microengineered Bio-mimicry of Human Physiological Systems, Department of Mechanical Engineering, Korea University, August 2019

Microengineered Bio-mimicry of Human Physiological Systems, Ministry of Food and Drug Safety, Osong, Korea, July 2019

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

Human Organs-on-a-chip: Microengineered Bio-mimicry of Human Physiological Systems, Hallym University Medical Center, Korea, May 2019

Distinguished lectureship: ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips,*** Institute of Medical Science (IMS), University of Toronto, Toronto, Canada, May 2019

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, 2019 Korean Society for Biotechnology and Bioengineering Spring Meeting and International Symposium, Jeju, Korea, April, 2019

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, National Institute of Biomedical Imaging and Bioengineering, NIH, Bethesda, MD, USA, March 2019

Plenary: ***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

One New Thing, IEEE Micro and Nanotechnology in Medicine Meeting, Kauai, HI, USA, December 2018

130. ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips,*** Department of Mathematical Sciences, University of Delaware, Newark, DE, USA, December 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Materials Research Society Meeting (MRS) Fall Meeting, Boston, MA, USA, November 2018

Plenary: ***Microengineered Physiological Bio-mimicry: Human Organs-on-Chips,*** Lush Conference, Berlin, Germany, November 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Department of Mechanical and Aerospace Engineering, Ohio State University, Columbus, OH, USA, October 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, The 4th International Cancer Immunotherapy Conference, New York, NY, USA, September 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Organ-on-a-Chip World Congress and 3D Bioprinting, San Diego, CA, USA, September 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, The 11th World Congress for Microcirculation, Vancouver, Canada, September 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Department of Physics, Seoul National University, Seoul, Korea, August 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Department of Chemistry, Seoul National University, Seoul, Korea, August 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Department of Materials Science and Engineering, Seoul National University, Seoul, Korea, August 2018

120. **Microengineered Physiological Bio-mimicry: Human Organs-on-Chips**, Department of Biology, Seoul National University, Seoul, Korea, August 2018

Microengineered Physiological Bio-mimicry: Human Organs-on-Chips, Department of Mechanical Engineering, Seoul National University, Seoul, Korea, August 2018

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, The 11th Annual Business Regenerative Medicine Conference, Philadelphia, PA, USA, July 2018

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Yonsei University College of Medicine, Seoul, Korea, June 2018.

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The 10th International Symposium on Microchemistry and Microsystems, Busan, Korea, June 2018

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

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Ontario-on-a-Chip/ NSERC TOeP research day, University of Toronto, Toronto, Canada, May 2018

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

New Developments in Organ Chip Designs: The Placenta-Chip and Eye-Chip, 2018 AAAS Annual Meeting, Austin, TX, USA, February 2018

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

110. ***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

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, British Thoracic Society Winter Meeting 2017, London, UK, December 2017

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Launch & Strategic Visioning Workshop, Canadian Center for Alternatives to Animal Methods, University of Winsor, Windsor, Ontario, Canada, October 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, US-Korea Conference on Science, Technology and Entrepreneurship 2017 (UKC), Washington, DC, USA, August 2017

Leveraging Organ-on-a-Chip Technology to Study the Human Placenta, The Human Placenta Project (HPP) Annual Meeting, Bethesda, MD, USA, July 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Division of Pulmonary and Critical Care Medicine, Seoul National University, Seoul, Korea, July 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Mechanical Engineering, Inha University, Incheon, Korea, July 2017

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, SELECTBIO Organ-on-a-chip Workshop, Boston, USA, July 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Oak Ridge National Laboratory, Oak ridge, TN, USA, June 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, 21st Congress of International Society of Aerosols in Medicine (ISAM), Santa Fe, NM, USA, June 2017

100. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Baltimore, MD, USA, May 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Penn Cardiovascular Institute (CVI), University of Pennsylvania, Philadelphia, PA, USA, May 2017

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, SELECTBIO Organ-on-a-chip Workshop, Munich, Germany, May 2017

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

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Experimental Biology Annual Meeting, Chicago, IL, USA, April 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Institute for Advanced Materials, Devices, and Nanotechnology (IAMDN), Rutgers University, NJ, USA, April 2017

Distinguished lectureship: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Annual Research Day, Royal College of Surgeons in Ireland, Dublin, Ireland, March 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, The Society of Toxicology (SOT) Annual Meeting, Baltimore, MD, USA, March 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Biomedical Engineering, UC Davis, CA, USA, February 2017

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, The 2017 Association for Research in Otolaryngology Meeting, Baltimore, MD, USA, February 2017

90. **Keynote:** ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Society of Toxicology of Canada (STC) 47th Annual symposium, Ottawa, Canada, December 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, IEEE Micro and Nanotechnology in Medicine Meeting, Hawaii, HI, USA, December 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, NIDDK workshop "The Adipose Tissue Niche: Role in Health and Disease", Bethesda, MD, USA, November 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, LifeNet Health Institute for Regenerative Medicine, Virginia Beach, VA, November 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Penn Institute for Regenerative Medicine (IRM), Philadelphia, PA, USA, November 2016

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Korean Society of Biotechnology and Bioengineering (KSBB) Annual Meeting, Gwangju, Korea, October 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Middle Atlantic Reproduction and Teratology Association (MARTA) Annual Meeting, Lawrenceville, NJ, USA, October 2016

Analytical Chemistry Young Innovator Award Lectureship: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, microTAS2016, Dublin, Ireland, October, 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Organ-on-a-chip Workshop, University of Hong Kong, Hong Kong, October 2016

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

80. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Reproductive Sciences Seminar (RSS) Series, University of Colorado School of Medicine, Denver, USA, May 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, High-Content & Phenotypic Screening, Cambridge, UK, May 2016

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Microtechnologies in Medicine and Biology (MMB), Seoul, Korea, April 2016

Microengineered physiological pulmonary models, New Developments in *In Vitro* Models of the Pulmonary Epithelium, European Respiratory Society (ERS), Berlin, Germany, April 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, The Placental Association of the Americas Annual Symposium, Montreal, Canada, March 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Pittcon 2016, Atlanta, GA, USA, March 2016

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

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, CE Advanced Course, The Society of Toxicology (SOT) Annual Meeting, New Orleans, LA, USA, March 2016

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Mother Infant Research Institute (MIRI), Tufts University School of Medicine, Boston, MA, USA, November 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Chemical and Petroleum Engineering, University of Kansas, Lawrence, KS, USA, November 2015

70. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Department of Pharmacology and Physiology, Drexel University College of Medicine, Philadelphia, PA, USA, November 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Bio and Brain Engineering, KAIST, Daejeon, Korea, October 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, 3D Cell Culture: Organoid, Spheroid, and Organ-on-a-Chip Models, Boston, MA, USA, November 2015

Organs-on-Chips and microphysiological systems, MicroTAS2015, Gyeongju, Korea, October 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, US-Korea Conference on Science, Technology and Entrepreneurship 2015 (UKC 2015), Atlanta, GA, USA, July 2015

Plenary: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Inflammation at Barrier Surfaces: From Bench to Bedside, McGill University, Montreal, Canada, June 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, 10th Anniversary Symposium, Center of Excellence in Environmental Toxicology, Philadelphia, PA, USA, May 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Digestive Disease Week (DDW) 2015 Meeting, Washington, DC, USA, May 2015

Microengineered Bio-mimicry of Human Organs, TEDxLMSD, Ardmore, PA, USA, May 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Mechanical Engineering, University of California, Santa Barbara, CA, USA, April 2015

60. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Department of Chemical Engineering, Columbia University, New York, NY, USA, April 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Penn Fibrosis Symposium, University of Pennsylvania, Philadelphia, PA, USA, April 2015

Microengineered Bio-mimicry of Human Organs, TEDxPenn, Philadelphia, PA, USA, April 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Pharmacology and Toxicology, Rutgers University, Piscataway, NJ, USA, March 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, American Association of Anatomists (AAA) Annual Meeting, Boston, MA, USA, March 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Department of Biomedical Engineering, New Jersey Institute of Technology, Newark, NJ, USA, March 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, The Society of Toxicology (SOT) Annual Meeting, San Diego, CA, USA, March 2015

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Penn LAM Symposium, Airways Biology Initiative, University of Pennsylvania, PA, USA, February 2015

Plenary: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The 4th International Conference on Additive Manufacturing and Bio-Manufacturing, Beijing, China, November 2014

Plenary: ***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

50. ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, Schepens Eye Institute, Harvard Medical School , Boston, MA, USA, October 2014

Microengineered Physiological Bio-mimicry for Pulmonary Research, European Respiratory Society International Congress 2014, Munich, Germany, September 2014

Keynote: ***Microengineered Physiological Bio-mimicry; Human Organs-on-Chips***, The 7th World Congress in Biomechanics, Boston, MA, USA, July 2014

Microengineered Physiological Bio-mimicry for Lung Research, Thomas L. Petty Aspen Lung Conference, Aspen, CO, USA, June 2014

Keynote: ***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

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, 13th Annual World Pharma Congress, Boston, MA, USA, May 2014

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Center for Research on Reproduction and Women's Health, University of Pennsylvania, PA, USA, February 2014

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Institute for Medicine and Engineering Seminar Series, University of Pennsylvania, PA, USA, November 2013

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Pulmonary, Allergy, and Critical Care Division Research Conference, University of Pennsylvania, PA, USA, November 2013

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

40. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA, November 2013

Microengineered Physiological Bio-mimicry; Human Organs-on-Chips, Scheie Eye Institute, University of Pennsylvania, PA, USA, October 2013

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Mechanical Engineering, Texas Tech University, TX, USA, October 2013

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

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

Plenary: ***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

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Pathology, Samsung Medical Center, Seoul, Korea, April 2013

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Chemical and Biological Engineering, Seoul National University, Seoul, Korea, March 2013

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Internal Medicine, Asan Medical Center, Seoul, Korea, March 2013

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Dermatology, Seoul National University Hospital, Seoul, Korea, March 2013

30. ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, The 13th Annual International Proteomics Conference, Seoul, Korea, March 2013

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

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Electronics and Telecommunications Research Institute, Seoul, Korea, February 2013

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

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Anesthesiology, Seoul National University Hospital, Seoul, Korea, January 2013

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Division of Nephrology, Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea, November 2012

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

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

A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications, Nano Korea: International Symposium on Nanotechnology, Seoul, Korea, July 2012

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

20. ***How can we model the complex alveolar microenvironment?*** American Thoracic Society, San Francisco, CA, USA, May 2012

A Human Breathing Lung-on-a-chip, The 2012 Annual Spring Meeting of The Korean Biochip Society, Korea, May 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Mechanical Engineering, Sogang University, Seoul, Korea, April 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Korea Institute of Science and Technology, Seoul, Korea, March 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, Korea, March 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Mechanical Engineering, Stanford University, Stanford, CA, USA, February 2012

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

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Biomedical Engineering, Boston University, Boston, MA, USA, February 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Institute for Environmental Medicine, University of Pennsylvania School of Medicine, Philadelphia, PA, USA, January 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, USA, January 2012

10. ***Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications***, Department of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, USA, January 2012

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Biomedical Engineering, Carnegie Mellon University, Pittsburg, PA, USA, November 2011

Plenary: ***A Human Breathing Lung-on-a-chip for Drug Screening and Nanotoxicology Applications***, Annual Merck Research Laboratories Respiratory Symposium, Boston, MA, USA, November 2011

Plenary: ***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

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

A Human Breathing Lung-on-a-chip, American Thoracic Society, Denver, CO, USA, April 2011

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Mechanical Engineering Seminar, MIT, Boston, MA, USA, March 2011

Biologically Inspired Micro- and Nanofluidic Systems for Biomedical Applications, Department of Bioengineering Seminar, University of California, Berkeley, CA, USA, February 2011

A Human Breathing Lung-on-a-chip, Watching the Lung Work, Germany, September 2010

1. ***A Human Breathing Lung-on-a-chip***, World Congress of Biomechanics, Singapore, August 2010

Former trainees

Haijiao Liu (postdoc)**:** Assistant Professor, School of Bioengineering, Dailan University of Technology

Pouria Fattahi (postdoc)**:** Assistant Professor, School of Chemical, Materials, and Biomedical Engineering, University of Georgia

Jungwook Paek (postdoc)**:** Assistant Professor, Electrical & Computer Engineering, SUNY Binghamton

Woo-Ri Shin (postdoc): Assistant Professor, Medicine, Chungngbuk National University

Mark Mondrinos (postdoc)**:** Assistant Professor, Biomedical Engineering, Tulane University

Ju Young Park (postdoc)**:** CTO, BioBricks Inc.

Keon Woo Kwon (postdoc)**:** Research Scientist, LegoChem

Nicole Lu (postdoc): Senior Research Scientist, Alcon

Minseon Cho (postdoc): Research Scientist, Tavotek Biotherapeutics

Sunghee Estelle Park (PhD): Assistant Professor, Biomedical Engineering, Purdue University

Andrei Georgescu (PhD): Founding CEO, Vivodyne Inc.

Jeongyun Seo (PhD): Samsung Advanced Institute of Technology

Research training

Current trainees

Postdocs & Research Associates

- Sezin Aday Aydin
- Minsuh Kim
- Mousa Younesi
- Sohaib Hashimi
- Se-jeong Kim
- Suhyun Jung
- Bumjun Park
- Pihu Mehrotra

PhD students

Jeehan Chang
Anni Wang
Dora Maria Racca
Nikolaos Matisioudis

MS/UG/Others

- Kishan Shah
- Prattay Bhattacharya
- Zong Yao Tan (lab manager)

Former trainees

Cassidy Blundell (PhD): Partner, Mission BioCapital

Haonan Hu (MS): BME PhD student at U Michigan

Albertina Lee (UG/MS): MD/PhD student, Washington Univ

Ray Ou (MS): BE PhD student, Penn

Alina Dong (MS): BE PhD student, Penn

Marco Fu (MS): Manufacturing Engineer, Bioplate

Ning Guo (MS): Research Scientist, George Xu's group at Penn Medicine

Tracy Gao (MS): Pharmacology PhD student, Duke

Shwan Kang (UG/MS): BE PhD student, Harvard

Jasmine Shong (lab manager): Scientist, BlueWhale Bio

Samira Mehta (UG/MS): Student, U of Michigan Med School

Jessica Schwartz (UG/MS): Student, Hofstra Medical School

Toren Arginteanu (UG/MS): MD/PhD student, Johns Hopkins

Aidi Liu (MS): PhD student, Rice

Joseph Song (MS): PhD student, Northwestern

Thesis committee

Catherine Wang (BE: SC Heo**)**

Abraham Waldman (BE: J Cremins**)**

Elucidating the effects of neural stimulation on chromatin folding, histone modifications and gene expression signatures in human neurons (2025)

Griffin Spychalski (BE: D Issadore**)**

Extracellular vesicle subpopulation isolation for early-stage cancer diagnosis (2025)

Adam Suppes (CBE: D Hammer**)**
The effect of T-lymphocyte upstream migration under shear flow (2022)

Lauren Beck (BE: A Raj)
Establishing an imaging-based methodology to systematically measure design principles of organoid systems (2021)

Sohaib Hashimi (BE: R Heuckeroth)
Role of ATCG2 mutations in visceral myopathy (2020)

Mina Chen (BE: J Burdick)
Cell delivery to the heart with injectable hyaluronic acid hydrogels for improved vascularization (2019)

Nicholas Anderson (BE: D Hammer)
The biophysics of leukocyte adhesion deficiency (2019)

Steven Henry (BE: D Hammer)
Biophysics of human neutrophil haptokinesis (2015)

Su Chin Heo (BE: R Mauck)
Differentiation induces dynamic alterations in mesenchymal stem cell nuclear architecture and mechanotransduction (2015)

Teaching

University of Pennsylvania

ENM2400 Differential Equations & Linear Algebra (F2023-F2025)
BE3500 Introduction to Biotransport Processes (S2014-S2020)
BE5100 Biomicrofluidics (F2014-F2021, S2023-S2026)
BE4900 & 4920 Independent Project in Bioengineering (2014-2016)

Seoul National University

BME461.62 Biological Micro-Electro-Mechanical Systems (2012-2013)
BME461.619 Special Topics in Biomedical Engineering (2012-2013)
M801.135 Introduction to Bioengineering (2012)

Harvard University

CB399 Microfluidics Nanocourse (2011)

University Service

Chair, Bioengineering Graduate Group (2026-present)

Member, Penn Engineering 2030 Research Committee (2025-present)

Member, Faculty Council, SEAS, Penn (2024-present)

Chair, Graduate Admissions Committee, Bioengineering Graduate Group (2022-2026)

Member, Professor of Practice Search Committee, SEAS, Penn (2023-2025)

Member, Graduate Admissions Committee, Bioengineering Graduate Group (2021-2022)

Member, Internal Advisory Board, Signh Center for Nanotechnology, Penn (2020-2023)

Member, Faculty Search Committee, Department of Bioengineering, SEAS, Penn (2016-2017)

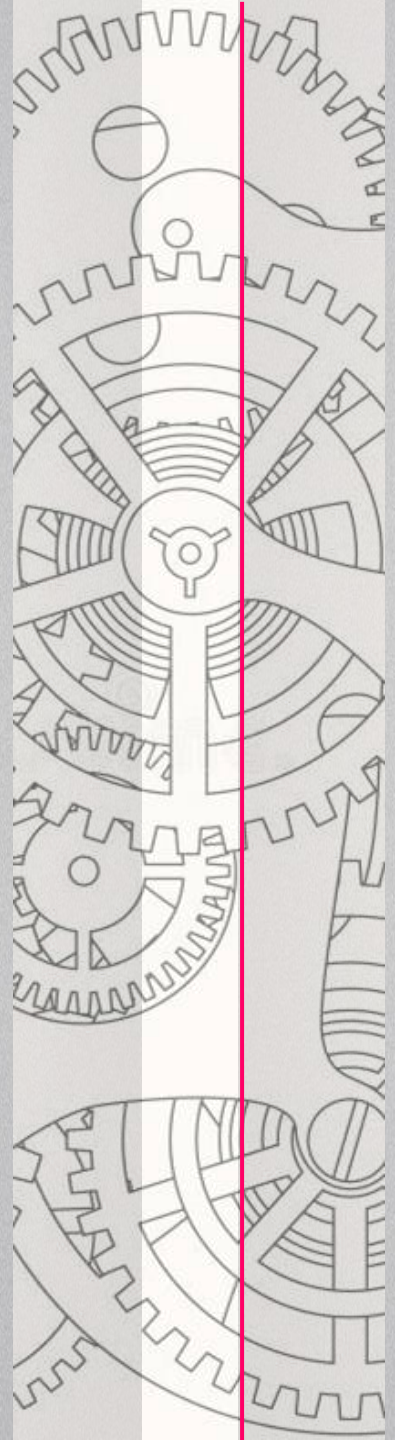
Professional service

Grant reviews:

NIH study sections (ad hoc) (2013-present)
Samsung Research Funding for Future Technology (2016-2019)
The Austrian Science Funds (2015)
The Lord Dowding Fund for Humane Research (2015)
Air Force Office of Scientific Research (2014)
Severo Ochoa Programme, Spanish National Agency for Scientific Evaluation (ANEP) (2014)
Agency for Science, Research & Technology (A*STAR), Singapore (2013)

Meeting organization:

Advisory Committee, NCATS/HESI MPS Annual Meetings (2021)
Session Chair, Biomedical Engineering Society (BMES) Annual Meeting (2019)
Chair, 2018 Microtechnologies in Medicine and Biology (MMB) (2018)
Session Chair, 2018 Annual AAAS Meeting (2018)
Session Organizer and Chair, 2017 Society for Laboratory Automation and Screening (SLAS) Meeting (2017)
Session Organizer and Chair, 2016 Society of Toxicology (SOT) Annual Meeting (2016)
Session Chair, Nanoengineering for Medicine and Biology (NEMB) (2016)
Session Organizer and Chair, 2015 US-Korea Conference on Science, Technology, and Entrepreneurship (2015)



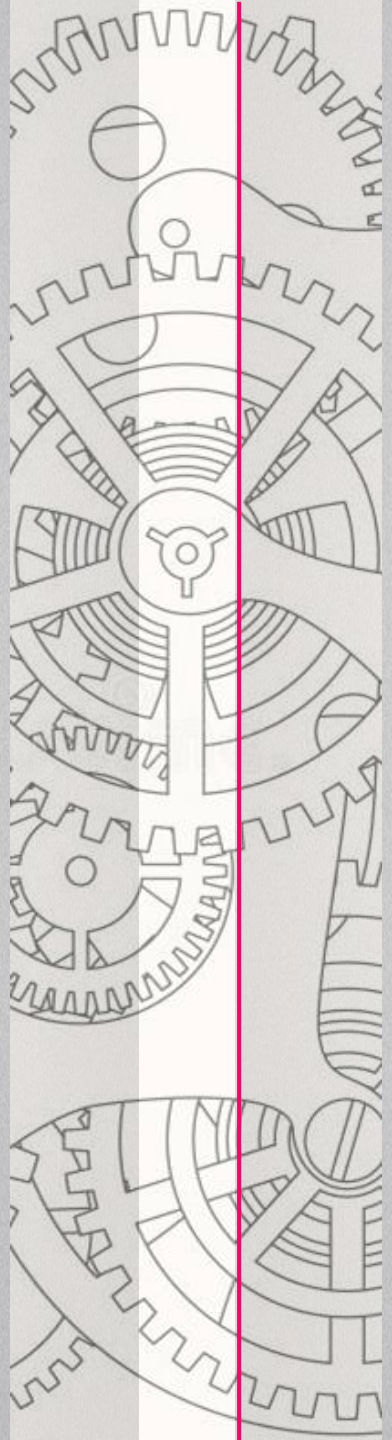
Meeting organization (continued):

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 (2015)
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 (2014)
Session Chair, The 47th Korean Society of Medical & Biological Engineering Annual Meeting (2013)
Session Chair, Biomedical Engineering Society (BMES) Annual Meeting (2012)
Session Organizer and Chair, 2012 Society for Laboratory Automation and Screening (SLAS) Meeting (2012)

Editorial activities:

Editorial Board Member, *Cell Stem Cell* (2026-present)
Co-Editor-in-Chief, *Microphysiological Systems* (2022-present)
Associate Editor-in-Chief, *Microphysiological Systems* (2017-2022)
Guest Editor, *Advanced Drug Delivery Reviews* (2022)
Guest Editor, *Nanoconvergence* (2021)
Guest Editor, *APL Bioengineering* (2019)
Guest Associate Editor, *Journal of Laboratory Automation* (2014)

Professional service

Journal reviews:

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