

**EDUCATION** *PhD* Molecular Engineering (Since AUT 2018)  
University of Washington, Seattle, WA

Applied Bioengineering 2017  
University of Washington, Seattle, WA

*BS* Physiology 2016  
University of Washington, Seattle, WA

**RESEARCH INTERESTS** Optogenetics, Protein design, Machine learning. Stem cells and tissue engineering, Neurobiology, Cardiac electrophysiology.

**HONORS & REWARDS** **Finalist**  
*Project: Cognitive Heart - Cardiovascular risk monitoring system harnessing supervised learning of heart rhythm abnormality.*  
2017 Hollomon Health Innovation Challenge

**Finalist**  
*Project: Jems Tech - Novel hands free Activated Clotting Test(ACT) device utilizing capillary blood for interventional cardiology.*  
2017 Hollomon Health Innovation Challenge

**Yohan and Rumie Cho Scholarship**  
2014 Korean-American Scientist and Engineers Association

**Outstanding Paper Award**  
2013 ASME Global Congress on Nano Engineering for Medicine and Biology

**Outstanding Poster Presentation Award**  
KSEA-NWRC 2013

**PUBLICATIONS** Jason C. Klima, Lindsey A. Doyle, **Justin H. Lee**, Michael Rappleye, Lauren A. Gagnon, Min Yen Lee, Anastassia A. Vorobieva, Jiayi Dou, Emilia P. Barros, Samantha Bremner, Cameron M. Chow, Lauren Carter, David L. Mack, Rommie E. Amaro, Joshua C. Vaughan, Andre Berndt, Barry L. Stoddard, David Baker. mFAPs: A Versatile Platform For New Fluorescent Protein Sensor Engineering. (submitting to Nature Methods on 5/6/2019)

Junghyun Kim#, Sukyoung Ko#, **Justin H. Lee**, Min Soo Bae Deok-Ho Kim, Jeong-Ho Yun, Fabrication of Nano-patterned Periodontal Ligament Stem Cell Sheet Using Thermos-responsive Substratum, *Journal of Periodontal and Implant Science* 47(6):402-415 2017

Alec Smith, Hyok Yoo, Hyunjung Yi, Eun Hyun Ahn, **Justin H. Lee**, Guozheng Shao, Ekaterina Nagornyak, Michael Laflamme, Charles E. Murry, and Deok-Ho Kim, "Micro-and nano-patterned conductive graphene-PEG hybrid scaffolds for cardiac tissue engineering," *Chemical Communications*. vol. 53, pp. 7412-7415 2017.

Kshitiz, Junaid Afzal, Eun Hyun Ahn, Yasir Suhail, Ruchi Goyal, Maimon E. Hubbi,

Qasim Hussaini, David D. Ellison, Jatinder Goyal, Benjamin Nacev, Deok-Ho Kim, **Justin H. Lee**, Sam Frankel, Rashmi Bankoti, Andy J. Chien, and Andre Levchenko, "Physical transfer of cytoplasmic proteins through cell-cell contact can lead to spread of signaling proteins," *Integrative Biology*. vol. 7, pp. 364-372, 2015.

Hyeona Jeon#, Sue Im Jang#, Jonathan H. Tsui, **Justin H. Lee**, Soojin Park, Deok-Ho Kim, and Yong Chool Boo, "Mechanoregulation of endothelial cytokines / chemokines secretion by laminar shear stress and nanotopographical cues," *ACS applied materials and interfaces*. vol. 7, pp. 4525-4532, 2015.

Yasir Suhail#, Kshitiz#, **Justin H. Lee**, Mark Walker, Deok-Ho Kim, Joel Bader, and Andre Levchenko, "Modeling intercellular transfer of biomolecules through tunneling nanotubes," *Bulletin of Mathematical Biology*. 2013 Aug;75(8)

## LAB SKILLS

*Biological:* Molecular cloning, Microinjection, Stem cell culture and maintenance, Cardiomyocyte directed-differentiation, Skeletal myoblast directed-differentiation, Laser scanning confocal microscopy, DIC microscopy, Westernblotting, immunofluorescence  
*Multiscale Fabrication:* Soft Lithography (Capillary force lithography), Electro-spinning deposition, Microfluidics, Surface functionalization, Prototyping (laser cutting, CNC milling, 3D printing).

*Computer language:* Python

## RESEARCH EXPERIENCES

Graduate Research Assistant Since Apr. 2018  
Andre Berndt Lab  
Department of Bioengineering  
University of Washington, Seattle, WA

- Structure-guided protein design of genetically encoded GCaMP-type GPCR fluorescent indicators.
- Development of high-throughput protein engineering pipeline.
- Mentored undergraduate students and volunteers
- Optogenetic modeling and rescue of neuropathological brain states in zebrafish.

Research Assistant Sept. 2011 - Mar. 2018  
Deok-Ho Kim Lab  
Department of Bioengineering  
University of Washington, Seattle, WA

- Paid part-time research scientist from Jan. 2012 to Aug. 2012
- Multiscale device fabrication manager
- Mentored undergraduate students and volunteers
- Synergistic effects of topography and rigidity difference on human umbilical smooth muscle cell
- Thermoresponsive nanofabricated substratum for the engineering of three dimensional tissues with layer-by-layer architectural control
- Mathematical modeling of transfer of intercellular cytoplasmic proteins
- Cell migration on the ECM-like nanogroove scaffold.
- Biocompatible transparent substrate for corneal epithelial cell migration enhancement
- biomimetically nano-textured micro electrode array device for drug-induced cardiotoxicity screening
- Graphene-based multifunctional nanomaterials for cardiac tissue and stem cell Engineering

- Tissue engineered human neuromuscular junctions for study of CMT II pathophysiology
- iPSC myogenic differentiation
- Combinatorial maturation of iPSC derived skeletal muscle cell - nanotopography and mechanical stretching

Undergraduate Research Assistant Jun. 2011-Nov. 2011  
 Microtechnology Laboratory (PI: We-Chih Wang)  
 Department of Mechanical Engineering  
 University of Washington, Seattle, WA

- Diamagnetic triangular levitating frictionless rotor - optimization and analysis on force distribution.

**OTHER  
 PROFESSIONAL  
 EXPERIENCES**

Co-Founder Since Jan. 2015  
 Nanosurface Biomedical Inc., Seattle, WA

- NanoSurface Biomedical brings nanotopography to various *in vitro* system to recapitulate micro cellular environment that enables more "physiological" cell/tissue culture.
- led technological transfer, successfully launched first product line "ANFS"
- led prototype development for biomimetic 3D cell culture system.
- participated in Comprehensive In Vitro Proarrhythmia Assay phase II field study
- moved from management role to consulting role to focus on academic research
- led Cytostretcher chamber development.

Internship Sept. 2017-Dec. 2017  
 Microsoft Research

- Supervisor: Asta Roseway
- Self-powered health monitoring wearables.
- lithographic approach to generate leaf like fluidic system.

Research Analyst Oct. 2017-Jan 2018  
 Global Good/Intellectual Ventures Lab

- Literature review on cocktail by E. coli

Barista, Assistant Manager Jun. 2011-May 2013  
 The Ugly Mug Cafe, Seattle, WA

- Performed various duties including cooking, brewing, employee training, ordering, and inventory control.
- Improved interpersonal and communication skills through working with public and coworkers
- Developed multi-tasking Skills

Executive Secretary Internship Presidential Visit of Summer 2011  
 Office of Presidential Spokesman of the Republic of Korea

- Primary responsibilities include media communication and monitoring.
- Assisted administrative secretary works.
- Provide oral and written interpretation services. (KOR-ENG, ENG-KOR)

**EXTRA-CURRICULAR ACTIVITIES**

- Community Church of Seattle(CCS) Adelpos Campus Worship  
• *Director of Music and Services* Apr. 2011-Jun. 2017
- Engineering Discovery Days 2012, 2013
- Paws On Science 2012, 2013, 2014
- Korean-American Scientist and Engineers Association(KSEA)  
• *Membership Coordinator* Since Sept. 2012  
• *Vice President* Since Mar. 2013
- KSEA-Northwest Regional Conference 2013 Aug. 2013  
• *Technical Committee*
- US-Korea Conference 2014 Aug. 2014  
• *Poster Section Coordinator*

**POSTER& ABSTRACTS**

1. **Justin H. Lee**, Mike Rappleye, Jeanot Muster, Amanda Nguyen, Netta Smith, Pooja Annigeri, Andre Berndt. Optogenetic modeling and rescue of neuropathological brain states in zebrafish. Neural Computation and Engineering Connection 2019, Seattle, WA.
2. Hyeona Jeon#, Sue Im Jang#, Jonathan H. Tsui, **Justin H. Lee**, Soojin Park, Deok-Ho Kim, and Yong Chool Boo. Interplay between matrix topography and stiffness in the regulation of endothelial cytokines and chemokine secretion. American Society for Cell Biology 2016, San Francisco CA
3. Hyok Yoo, **Justin H. Lee**, Katya Nagornyak, Hyun Jung Lee, Deok-Ho Kim. Multifunctional Graphene-based Nanostructures for Cardiac Tissue Engineering. KSEA-NWRC 2013, Seattle WA
4. **Justin H. Lee**, Hyok Yoo, Katya Nagornyak, Hyun Jung Lee, Deok-Ho Kim. Graphene oxide enhance cardiac maturation. KSEA-NWRC 2013, Seattle WA, US-Korea Conference 2014, San Francisco CA
5. Somali Chaterji, Peter Kim, Hyun Lee, Kshitiz Gupta, **Justin Lee**, Aaron Baker, Deok-Ho Kim. The combined effect of matrix stiffness and nanotopography on the regulation of vascular smooth muscle cell function. BMES 2013 Annual Meeting, Seattle WA
6. **Justin Lee**, Deok-Ho Kim. Biocompatible poly(2-Hydroxyethyl Methacrylate) Nano-Groove Substrate. 2013 UW Undergraduate Symposium
7. Alex Jiao, Nicole E. Tropper, Bora Lee, **Justin Lee**, Sung Gap Im, and Deok-Ho Kim. Nanoscale control over scaffold-free, anisotropic muscle tissue. Paper Number NEMB2013-93148. Proceedings of the 2013 ASME Global Congress on Nano Engineering for Medicine and Biology, February 4-6, 2013, Boston, MA, USA
8. Elsa Hagos, Jesse Macadangdang, **Justin Lee**, Deok-Ho Kim. Fabrication of multi-well nanopatterned cell culture platform. SACNAS abstract #9751, 2012 SACNAS National Conference, October 11-14, 2012, Seattle, WA, USA

**Teaching Experiences**

Teaching Assistant  
Department of Bioengineering  
University of Washington, Seattle, WA

- BIOEN 486/586 - Tissue Engineering (AUT 2015, WIN 2017)
- BIOEN 498/599 - Engineering Cell Biology (SPR 2016, AUT 2016, SPR 2017)

Independent research mentoring

Since Jan. 2013

Deok-Ho Kim Lab

Department of Bioengineering

University of Washington, Seattle, WA

- Senna Seulki Lee ( Undergraduate, University of Washington)
- Jacob Chong (Undergraduate, University of Washington)
- Victor Hsiao (Undergraduate, Princeton University)
- Kevin Kim (Undergraduate, UC Bekeley)
- Elsa Hagos (Undergratuante, University of Washington)
- Marcus Rodehamel (Undergraduate, University of Washington)
- Samir Kharoufeh (Undergraduate, University of Washington)