

Hyun Woo Sung

hsung10@jhu.edu | LinkedIn: HyunWooSung | Baltimore, MD

EDUCATION

The Johns Hopkins University

Doctor of Philosophy in Chemical and Biomolecular Engineering

Baltimore, MD

September 2017 - Expected May 2023

Relevant Coursework: Metabolic Engineering, Advanced Transport Phenomena, Advanced Thermodynamics, Interfacial Science with Application to Nanoscale Systems, Tissue Engineering, Advanced Cellular Biology I

The University of Massachusetts

Bachelor of Science in Chemical Engineering; GPA: 3.86/4.0 (Magna Cum Laude)

Amherst, MA

September 2013 - May 2017

Honors: Dean's Listed 8/8 Semesters, Phi Kappa Phi/Tau Beta Pi Society Member, 2016 Young Alumni/Chancellor's Scholarship Recipient

RESEARCH EXPERIENCE

Inertial Microfluidics for Biophysics and Biotechnology

Ph.D. Candidate, Department of Mechanical Engineering

Baltimore, MD

May 2019 - Present

- **Advisor:** Dr. Soojung Claire Hur, Ph.D.
- Researching microfluidic platform combining both vortex-assisted isolation and subsequent electroporation of exogenous bio-molecules into rare cancer cells
- Modulating device design and operating conditions for translational applications in patient-tailored therapy

Cell Biology & Tissue Engineering Laboratory

Ph.D. Candidate, Department of Anesthesiology and Critical Care Medicine

Baltimore, MD

January 2018 - April 2019

- **Advisor:** Dr. Lewis Romer, M.D.
- Investigated role of extracellular matrix stiffness and surface curvature in influencing insulin and nitric oxide secretion using physiologically and anatomically-relevant 3D micropatterned, biomimetic platforms
- Morphological behavior of cells to various curvature and matrix stiffness on scaffolds were presented as a poster at The Johns Hopkins Department of Medicine & Whiting School of Engineering Research Retreat 2018, 20th Annual Anesthesiology and Critical Care Research Day, and BMES 2019 with the current title "Assembly and characterization of curved and folded soft hydrogel cell culture platforms"
- **Collaborator:** Dr. Deepesh Pandey, Ph.D.
- Explored the post-translational regulation of HDAC6 activity via NEDD8 conjugation in endothelial cells experiencing oxidative injury
- Results were presented as posters at Experimental Biology 2018 and co-first author publication is in progress of submission with the title "Inhibition of Histone Deacetylase 6 Activity Provides Protection Against Atherogenesis: A Role For HDAC6 NEDDylation"
- Helped identify novel link between plasma lipid homeostasis and HDAC6 BUZ domain, and co-authored poster presentation at Experimental Biology 2019 with the title "Regulation of PCSK9 Levels by the Ubiquitin-Binding Domain of Histone Deacetylase 6"

Translational Biomaterials & Tissue Engineering Laboratory

Undergraduate Researcher, Department of Chemical Engineering

Amherst, MA

September 2015 - May 2017

- **Advisor:** Dr. Jungwoo Lee, Ph.D.
- Developed PDMS-based bioreactor system capable of inducing tunable mechanical, rotational, and shear force into standardized well plates
- Implemented porous hydrogel scaffolds mimicking bone marrow microenvironment to create dynamic 3D cell-culture platforms in well plates
- Modeled dynamic system in COMSOL to computationally quantify and visualize exerted shear force inside system
- Presented poster and oral presentation at several American Institute of Chemical Engineers (AIChE) Annual and Northeast Regional Conferences with original abstract "Applying 3D Mechanoculture to Standard Multi-Well Plates"
- Recipient of 2016 UMass Young Alumni Scholarship Grant supporting continual work and progress on bioreactor project

Korea Electronics Technology Institute

Research Internship, IT Materials & Components R&D Division of Display Research Center

Seoul, South Korea

June 2015 - Aug 2015

- **Advisor:** Dr. Beom-Jin Yoon, Ph.D.
- Tested the reliability of differential dynamic microscopy (DDM) technique as a novel, alternative method to the established dynamic light scattering (DLS) methodology by analyzing burst images of colloidal nanoparticles
- Analysis of light scattering via DDM, with subsequent Fourier optics analytics *in silico* corroborated well with dynamics from nanoparticles in display diodes, making this new methodology practical in terms of compatibility and economic feasibility.
- Script to analyze Brownian motion and particle dynamics was coded in both MATLAB and Microsoft Visual Studios

Korea University Immunobiology Laboratory

Summer Research Internship, Division of Biotechnology

Seoul, South Korea

June 2017 - Aug 2017

- **Advisor:** Dr. Taehoon Chun, Ph.D.
- Maintenance of cell and transgenic mice, protein purification, plasmid preparation and subsequent restriction digestion verification

SKILLS

- **Teaching Assistant Experience:** UMass Undergraduate TA for ChE 338 (Separation Principles)
- **Certified in:** Cell Culture of Animal Cells (BioTech Institute of Maryland)
- **Technically fluent in:** MATLAB, LaTeX, ASPEN, COMSOL, Microsoft Office Products, Adobe CC Suite

Spring 2017

Supervisor: Dr. Timothy Fawcett