

# Hyun-Ha Park

Mechabio Lab at Wonkwang University  
#3159, #59 Bldg, WKU, Iksandaero 460, Iksan, 54538, South Korea  
Cell phone: +82-10-9442-4346  
Office: +82-(0)63-850-6684  
E-mail: [plmn130@wku.ac.kr](mailto:plmn130@wku.ac.kr)  
Homepage: <http://www.mechabio.net>



## EDUCATION

- 9/2014 – 2/2020      **Ulsan National Institute of Science and Technology**  
Ph.D in Mechanical Engineering  
Research advisor: Professor Hoon Eui Jeong  
Dissertation: “Bioinspired polymeric nanoneedle array for effective and robust anti-biofouling”
- 9/2008 – 8/2010      **Chungnam National University**  
M.S. in Department of Chemical Engineering and Applied Chemistry  
Research advisor: Professor Dong-Pyo Kim  
Dissertation: “Fabrication of cell-chip from biocompatible dopamine chelated inorganic-organic hybrid and the drug screening application”
- 3/2004 – 2/2008      **Hanbat National University**  
B.S. in Material Engineering

## WORK EXPERIENCES

- 09/2020 – Present      **Wonkwang University**  
Department of Mechanical Engineering  
Assistant Professor
- 04/2020 – 08/2020      **Samsung Electro-Mechanics**  
Components Division  
Senior Research Engineer
- 12/2010 – 12/2013      **Korea Institute of Machinery & Materials**  
Nano-Convergence Mechanical Systems Research Division  
Department of Nano-manufacturing Technology  
Researcher

## PERSONAL SKILLS

- **Experimental skills:**
  - Patterning** - Micro/Nanopatterning (Photo / Soft lithography, UV / Thermal / R2R / LTIL imprint lithography)
  - Bio** - Bacteria / Protein / Platelet / Mammalian cells culture, CFU test, Live/ Dead assay, Fixation, Porcine Skin / Bone / Platelet staining, Crystal violet staining, MTT assay
- **Operating equipment's:** Contact angle, Tensile test, Adhesion / Shear / Friction test, SEM, AFM 3D profiler, Confocal microscope, Oxygen plasma, Spin-coater, Optical density measurement

- **Analysis:** FT-IR, XPS, EDX, TEM, Statistics

## **RESEARCH INTERESTS**

- Nano Biotechnology, Tissue Engineering, Biomaterials, Organ-on-a-chip, Stem Cell Engineering, Micro/nano applications

## **HONORS AND AWARDS**

- 2022 The Innovation Award, The Korean Society of Manufacturing Process Engineers – Spring Conference
- 2021 The Young Engineer Award, The Korean Society of Manufacturing Process Engineers – Fall Conference
- 2020 The Best Paper Award, The Korean Society of Manufacturing Technology Engineers – Fall Conference
- 2020 The Best Graduate Student Paper Award, Ulsan National Institute of Science and Technology-Mechanical engineering department
- 2019 The Best Paper Award, The Korean Society of Manufacturing Technology Engineers – Fall Conference
- 2019 Outstanding Paper Award, The Korean Society for Precision Engineering – Fall Conference
- 2019 Outstanding Paper Award, The Korean Society of Mechanical Engineers – Ulsan Branch Spring Conference
- 2019 The Best Paper Award, The Korean Society of Manufacturing Technology Engineers – Spring Conference
- 2018 The Best Paper Award, The Korean Institute of Surface Engineering – Fall Conference
- 2017 The Best Paper Award, The Korean Society of Mechanical Engineers – Ulsan Branch Spring Conference
- 2017 The Best Paper Award, The Korean Society of Mechanical Engineers – Bio Engineering Divisions Spring Conference
- 2016 Outstanding Paper Award, The Korean Society of Manufacturing Technology Engineers –Spring Conference
- 2015 Outstanding Paper Award, The Korean Society for Precision Engineering – Fall Conference
- 2013 The Best Paper Award, 39th International conference on Micro and Nano Engineering
- 2008 The Best Paper Award, The 1st Korea-Japan Joint Forum on Sol-Gel Science and Technology

## **PUBLICATIONS**

1. H.-K. Kim, S.-J. Han, Y.-S. Cho\*, and **H.-H. Park\***, "Antibacterial and Anti-Fogging Nanopillar Array Films: Targeted Efficacy Against Staphylococcus aureus", *ACS Appl. Polym. Mater.*, 6, 5, 2836-2848 (2024) (IF: 5.0/Ranking: 18 %) **[\* co-corresponding author] [Supplementary cover]**
2. H.-K. Kim, H. W. Baek, **H.-H. Park\***, and Y.-S. Cho\*, "Reusable mechano-bactericidal surface with echinoid-shaped hierarchical micro/nano-structure", *Colloids Surf. B*, 234, 113729 (2024) (IF: 5.8/Ranking: 12.1 %) **[\* co-corresponding author]**
3. H.-J. Jeong, H. Nam, J.-S. Kim, S. Cho, **H.-H. Park**, Young-Sam Cho, Hyungkook Jeon, Jinah Jang, and Seung-Jae Lee, "Dragging 3D printing technique controls pore sizes of tissue engineered blood vessels to induce spontaneous cellular assembly", *Bioact. Mater.*, 31,590–602 (2024) (IF: 18.9/Ranking: 1.1 %)
4. H.-K. Kim, S.-J. Jang, Y.-S. Cho\*, **H.-H. Park\***, "Fabrication of nanostructured polycaprolactone (PCL) film using a thermal imprinting technique and assessment of antibacterial function for its application", *Polymers*, 14(24), 5527 (2022) (IF: 5.0/Ranking: 18 %) **[\* co-corresponding author]**

5. S.-H. Lee, M. Kang, H. Jang, S. Kondaveeti, K. Sun, S. Kim, **H.-H. Park**, and H. E. Jeong, "Bifunctional Amphiphilic Nanospikes with Antifogging and Antibiofouling Properties", *ACS Appl. Mater. Interfaces*, 14, 39478-39488 (2022) (IF: 9.5/Ranking: 15.8 %)
6. **H.-H. Park**\*, "Fabrication and Assessment of Flexible Nanostructured Film for Antibacterial Properties", *J. Korean Soc. Manuf. Process. Eng.*, 21, 105-109, (2022)
7. H.-K. Kim, Y.-S. Cho\*, **H.-H. Park**\*, "PEGDMA-based pillar-shape nanostructured antibacterial film having mechanical robustness", *ACS Appl. Bio Mater*, 5(6), 3006-3012, (2022) (IF: 4.7/Ranking: 47.8 %) [\* co-corresponding author] [Supplementary cover]
8. G. Choi†, H. Ko†, H. Jang, I. Hwang, M. Seong, K. Sun, **H.-H. Park**, T.-E. Park, J. Kim\* and H. E. Jeong\*, "Biofouling-resistant tubular fluidic device with magneto-responsive dynamic walls", *Soft Matter*, 17, 1715-1723 (2021) [Front Cover] (IF: 3.4/Ranking: 33.5 %)
9. I. Hwang, M. Seong, H. Yi, H. Ko, **H.-H. Park**, J. Yeo, W.-G. Bae, H. W. Park, and H. E. Jeong\*, "Low-resistant electrical and robust mechanical contacts of self-attachable flexible transparent electrodes with patternable circuits", *Adv. Funct. Mater*, 200458 (2020) (IF: 19 /Ranking: 4.2 %)
10. H. Ko†, **H.-H. Park**†, H. Byeon, M. Kang, J. Ryu, H. J. Sung, S. J. Lee\*, and H. E. Jeong\*, "Undulatory topographical waves for flow-induced foulant sweeping", *Science Advances*, 5, eaax8935 (2019). [† co-first author], [Press released] (IF: 13.6 /Ranking: 8.9 %)
11. S. Park†, **H.-H. Park**†, K. Sun, Y. Gwon, M. Seong, S. Kim, T.-E. Park, H. Hoon, Y.-H. Choung, J. Kim\*, and H. E. Jeong\*, "Hydrogel Nanospine Patch as a Flexible Anti-Pathogenic Scaffold for Regulating Stem Cell Behavior", *ACS Nano*, 13, 11181–11193 (2019). [† co-first author], [Press released] (IF: 17.1/Ranking: 3.78%)
12. S. Park, T. Kim, Y. Gwon, S. Kim, D. Kim, **H.-H. Park**, K.-T. Lim, H. E. Jeong\*, K. Kim\*, J. Kim\*, "Graphene-layered Eggshell Membrane as a Flexible and Functional Scaffold for Enhanced Proliferation and Differentiation of Stem Cells", *ACS Appl. Bio Mater*, (2019). (IF: 4.7/Ranking: 47.8 %)
13. **H.-H. Park**, K. Sun, M. Seong, D. Lee, C. Cha and H. E. Jeong\*, "Cellulose acetate nanoneedle array covered with phosphorylcholine moiety as a biocompatible and sustainable antifouling material", *Cellulose*, 26, (2019). (IF: 5.7/Ranking: 2.4%)
14. M. Seong†, **H.-H. Park**†, I. Hwang, and H. E. Jeong\*, "Strong and Reversible Adhesion of Interlocked 3D-Microarchitectures", *Coatings*, 9, 48 (2019). [† co-first author] (IF: 3.4/Ranking: 35.3 %)
15. **H.-H. Park**†, K. Sun†, M. Seong, M. Kang, S. H. Park, S. K. Hong, H. S. Jung, J. Jang, J. Kim\* and H. E. Jeong\*, "Lipid-Hydrogel-Nanostructure Hybrids as Robust Biofilm-Resistant Polymeric Materials", *ACS Macro Lett.*, 8, 64-69 (2019). [Supplementary Cover], [Press released] (IF: 5.8 /Ranking: 9.9 %)
16. K. Sun†, H. Ko†, **H.-H. Park**, M. Seong, S.-H. Lee, H. Yi, H. W. Park, T.-i. Kim, C. Pang, and H. E. Jeong\*, "Hybrid Architectures of Heterogeneous Carbon Nanotube Composite Microstructures Enable Multiaxial Strain Perception with High Sensitivity and Ultrabroad Sensing Range", *Small*, 14, 1803411 (2018). [Inside Front Cover] (IF: 13.3/Ranking: 6.6 %)
17. **H.-H. Park**, M. Seong, K. Sun, H. Ko, S. M. Kim, and H. E. Jeong\*, "Flexible and Shape-Reconfigurable Hydrogel Interlocking Adhesives for High Adhesion in Wet Environments Based on Anisotropic Swelling of Hydrogel Microstructures", *ACS Macro Lett.*, 6, 1325-1330 (2017). [ACS Editors' Choice Article], [Front Cover], [Press released] (IF: 5.8 /Ranking: 9.9 %)

18. R. Kwak, **H.-H. Park**, H. Ko, M. Seong, M. K. Kwak, and H. E. Jeong\*, “Partially Cured Photopolymer with Gradient Bingham Plastic Behaviors as a Versatile Deformable Material”, *ACS Macro Lett.*, 6, 561-656 (2017). (IF: 5.8 /Ranking: 9.9 %)
19. M. Seong, C. Jeong, H. Yi, **H.-H. Park**, W.-G. Bae, Y.-B. Park, and H. E. Jeong\*, “Adhesion of bioinspired nanocomposite microstructure at high temperature”, *Appl. Surf. Sci.*, 413, 275–283 (2017). (IF: 6.7/Ranking: 2.4%)
20. J.J. Lee\*, **H.-H. Park**, K.-B. Choi, G.H. Kim, H.J. Lim, “Fabrication of hybrid structures using UV roll-typed liquid transfer imprint lithography for large areas”, *Microelectron. Eng.*, 127, (2014). (IF: 2.73/Ranking: 47.66%)
21. J.H. Ryu, S.-H. Lee, H.J. Lim, **H.-H. Park**, J.J. Lee\*, “Study of air bubble generation and its minimization during dispensing based ultraviolet nanoimprint lithography (UV-NIL)”, *Microelectron. Eng.*, 123, (2014). (IF: 2.73/Ranking: 47.66%)
22. H.J. Lim, K.-B. Choi, G. Kim, S. Lee, **H.-H. Park**, J.H. Ryu, S. Jung, J.J. Lee\*, “Roll-to-Roll Nanoimprint Lithography for Patterning on a Large-area Substrate Roll”, *Microelectron. Eng.*, 123, (2014). (IF: 2.73/Ranking: 47.66%)
23. G. Kim, M. Jeong, **H.-H. Park**, H.J. Lim, J.J. Lee\*, “A New Mold Structure to Replicate Patterns Over 1  $\mu\text{m}$  in Depth for Substrate Conformal Imprint Lithography”, *J. NANOSCI. NANOTECHNO.*, 13, (2013). (IF: 1.28/Ranking: 91.48%)
24. H.J. Lim, J.J. Lee, S. Park, K.B. Choi, **H.-H. Park**, J.H. Ryu, “Replication of a Thin Polydimethylsiloxane Stamp and Its Application to Dual-Nanoimprint Lithography for 3D Hybrid Nano/Micropatterns”, *J. NANOSCI. NANOTECHNO.*, 12, (2012). (IF: 1.28/Ranking: 91.48%)
25. **H.-H. Park**, H.J. Lim, S.H. Lee and J.J. Lee\*, “Fabrication of an adhesion-free transparent roll stamp for large area patterning using ultraviolet-type roller nanoimprint lithography”, *J. Vac. Sci. Technol. B*, 30, 06FB11 (2012). [Front Cover] (IF: 2.131/Ranking: 73.39%)
26. **H.-H. Park**, S. Park, H. Kim, H.J. Lim, D.-P. Kim and J.J. Lee\*, “Non-sticky polyvinylsilazane stamp with high durability for UV-nanoimprint lithography”, *Microelectron. Eng*, 98, (2012). (IF: 2.73/Ranking: 47.66%)
27. S. Park, **H.-H. Park**, O.H. Han, S.A. Chae, D. Lee, D.-P. Kim, “Non-sticky silicate replica mold by phase conversion approach for nanoimprint lithography applications”, *J. Mater. Chem.* 20, (2010). (IF: 6.626/Ranking: 18.75%)

## **PATENTS**

### **<Pending>**

1. 정훈의, **박현하**, 선가현 “나노 구조물을 가지는 방오 필름 및 이의 제조방법”, 10-2019-0009848 (2019)
2. 정훈의, 고한길, **박현하** “자기 반응 동적 표면을 활용한 방오 부재”, 10-2019-0023063 (2019)
3. 정훈의, **박현하**, 선가현 “방오성을 가지는 방오 표면 구조”, 10-2019-0044400 (2019)
4. 정훈의, **박현하**, 선가현 “자기 회복성을 가지는 방오 장치”, 10-2019-0044401 (2019)
5. 정창윤, 박영빈, 정훈의, **박현하** “염분 농도 측정 장치 및 이를 이용한 염분 농도 측정 방법” 10-2018-0059606 (2018)
6. 정훈의, **박현하** “하이드로젤을 이용한 벨크로 장치 및 이의 제조방법”, 10-2016-0110673 (2016)
7. 정훈의, **박현하** “하이드로젤을 이용한 벨크로 장치 및 이의 제조방법”, 10-2016-0064190 (2016)

**<Registration>**

1. 정훈의, 고한길, 박현하 “자기 반응 동적 표면을 활용한 방오 부재”, 10-2087232 (2020)
2. 정훈의, 박현하, 선가현 “자기 회복성을 가지는 방오 장치”, 10-2168854 (2020)
3. 정훈의, 박현하, 선가현 “방오성을 가지는 방오 표면 구조”, 10-2132728 (2020)
4. 정훈의, 박현하 “하이드로젤을 이용한 벨크로 장치 및 이의 제조방법”, 10-1893173 (2018)
5. 정훈의, 박현하 “하이드로젤을 이용한 벨크로 장치 및 이의 제조방법”, 10-1867058 (2018)
6. 김기홍, 이재종, 최기봉, 임형준, 박현하 “균일 두께의 중간층을 가지는 레플리카 스탬프 제조 방법”, 10-1258077 (2013)