WON-KYU LEE

Department of Materials Science and Engineering
Hongik University
Homepage: lqlab.com

Mobile: +82-10-7319-6870
Email: wklee@hongik.ac.kr
ORCID 0000-0002-7878-1981

ACADEMIC TRAINING AND APPOINTMENTS

Hongik University, Materials Science and Engineering, 2021-Present, Assistant Professor

Harvard University, Chemistry and Chemical Biology, 2018-21, Postdoctoral Fellow

Northwestern University, Materials Science and Engineering, 2018, Ph.D.

Yonsei University, Electrical and Electronic Engineering, 2010, M.S.

Yonsei University, Materials Science and Engineering, 2008, B.S.

RESEARCH AND PROFESSIONAL EXPERIENCE

Principal Investigator (PI), **Electrocatalysis and Energy Materials Lab., Hongik University, 2021-present**

- Strain- and defect engineering of transition metal (di)chalcogenides for hydrogen energy systems
- Design and development of photocatalysts based on strain-engineered two-dimensional (2D) nanomaterials
- Membrane electrode assembly (MEA)-based water electrolysis employing 2D electrocatalysts

Postdoctoral Researcher, George M. Whitesides Research Group, Harvard University, 2018-2021

- Developed pneumatic ring oscillators for autonomous control of soft-robot locomotion
- Conducted numerical and analytical design of pneumatic digital logic and circuits for robotic computers with artificial intelligence

Research Assistant, **Teri W. Odom Research Group, Northwestern University, 2013-2018**

- Machine-learning-based design of photonic nanostructures and manufacturing processes for broadband light manipulation over wafer-scale areas
- Scalable nanofabrication of 2D electronic metamaterials with programmable mechanical properties
- Designed biomimetic, hierarchical nanoarchitectures of soft materials using mechanical self-assembly

Senior Researcher (Military Service), **Division of Electronic Materials Research Institute, KOLON Central Research Park (S. Korea), 2010-2013**

- Developed carbon nanotubes and block-copolymer nanocomposites for flexible electronics and liquid crystal displays (LCDs)
- Commercialized a photo-initiator system for dry-film photoresist (RUBYGUARD®): prototype testing for semiconductor packaging at *Samsung Electro-Mechanics* (S. Korea) and *TNCSi* (Japan)

Research Assistant, Information Display Device Lab., Yonsei University, 2008-2010

- Characterized organic and inorganic thin-films; engineering electro-optic properties of flexible LCDs

AWARDS, FELLOWSHIPS AND GRANTS

Domestic

2026-29 글로벌 기초연구실 지원사업 심화형 (BRL, National Research Foundation of Korea), 연구책임자

2026-29 핵심연구 도약형 (National Research Foundation of Korea), 연구책임자
2024-25 신진연구자 인프라 지원사업 (Korea Basic Science Institute), 연구책임자
2022-26 우수신진연구 (National Research Foundation of Korea), 연구책임자
2021-26 공정조합설계 (National Research Foundation of Korea), 공동연구원
2021-22 기본연구 (National Research Foundation of Korea), 연구책임자
2021-23 나노소재기술개발사업 (National Research Foundation of Korea), 공동연구원
2021-22 소재부품기술개발사업 (Korea Evaluation Institute of Industrial Technology), 공동연구원

International

2017 Materials Research Society (MRS) Graduate Student *Gold* Award
2016 Outstanding Research Award (International Institute of Nanotechnology at Northwestern University)
2016-18 Ryan Fellowship (International Institute of Nanotechnology at Northwestern University)
2016 Best Paper Award (the 42nd ASME Design Automation Conference)
2013-18 Research Assistant Fellowship (Northwestern University)
2006 National Science and Technology Scholarship (Korea Science and Engineering Foundation)

PUBLICATIONS (*demonstrates for authors with equal contribution, †denotes corresponding authors)

Hongik Publications

1. S. Baek,* S. Shin,* J. Han, M. K. Nam, H. Jeon, J. Lee, M. K. Cho, S. Y. Kim, B. Shong,† I. S. Kim,† and **W.-K. Lee,**† "Phase-Engineered $MoTe_x$ Supporting $Ni(OH)_2$ Enables Enhanced Hydrazine Oxidation-Assisted Hydrogen Production," *in preparation*
2. M. H. Ali, **W.-K. Lee**, Y. Kwon,† "Phase-Field Modeling of Multi-Flake Growth and Grain-Boundary Formation in CVD-Grown 2D Materials," *submitted*
3. B. Hur, K. Jeong, J. Park, J. Kwon, C. E. Lee, Y. Choi, J. Kang, H. Jeon, J. Park, A. Gorospe, Y. Shao-Horn, J. Hong, Y.-T. Kim, **W.-K. Lee**, S.-Y. Lee, K.-Y. Park, D. Lee,† "Rapid Drying Synthesis of Amorphous Solid Solutions Beyond Crystalline and Glass-Forming Compositional Limits," *Nature Communications* **2026**, *in revision*
4. S. Kang, J. Pyo, M. Jung, S. Park, T. Kim, H. Jeon, J. Lee, **W.-K. Lee**, Y.-W. Lee, S. Cha, S. Pak,† "Tunable Bandgap of Copper Sulfide via Cation Exchange as a *p*-Type Transparent Electrode," *Nanoscale* **2026***, in press*
5. S. Han,* Y. Kweon,* H. Jeon,* J. H. Cho, J. Yim, J. Lee, J. Heo, S. Shin, S. J. Baek, M. Cho, S. Y. Kim, I. S. Kim,† M. Kim,† and **W.-K. Lee,**† "Amorphized and Oxidized Layered $PtSe_2$ as an All-in-One Electrocatalytic Platform for Hydrazine-Assisted Water Splitting," *Advanced Materials* **2026**, *in press*
6. J. Lee, S. Shin, S. Han, D. Lee, I. S. Kim,† **W.-K. Lee**,† "Beyond Monolayers: Activating Multilayer and Bulk Transition Metal Chalcogenides for Water Electrolysis," *Materials Horizons* **2026**, *under review* (**invited review article**)
7. Z. Liu,* R. M. Rasheed,* A. Rajappan, T. F. Yap, B. Jumet, R. Cisneros, Y. Song, G. Wehmeyer, **W.-K. Lee**, and D. J. Preston,† "Scalable Hot-Water-Repellent Superhydrophobicity," *ACS Applied Materials and Interfaces* **2026**, 18, 4401
8. P. Liu, J. Heo, H. Bong, J. Choe, H. Lee, **W.-K. Lee**, D. Son, J. Kang, T. Eom,† S. J. Park,† I. S. Kim,† "Functional Chalcogenide Materials for Memory and Sensing Applications," *International Journal of Extreme Manufacturing* **2026**, 8, 022003

9. S. Shin,* I. Cho,* S. Han,* J. Heo, J. Han, H. Jeon, M. Cho, D. J. Preston, I. S. Kim,† B. Shong,† and **W.-K. Lee**,† "Strain-Engineered Oxygen-Modified Nickel Telluride/Nickel Oxide Heterostructures for Bifunctional Alkaline Water Electrolysis," *ACS Nano* **2025***,* 19, 51, 42796 **(Highlighted as Back Cover article)**

10. J. Han,* M. K. Nam,* S. Shin,* I. Cho, S. Hwang, H. Jeon, M. K. Cho, D. J. Preston, M. C. Hersam, I. S. Kim,† B. Shong,† and **W.-K. Lee**,† "Efficient and Stable Electrocatalytic Oxygen Evolution from $MoTe_x/Ni(OH)_2$ Heterostructures," *Journal of the American Chemical Society* **2025**, 147, 44, 41096 (**Featured on National Research Foundation of Korea**)

11. H. Jeon,* J. Lee,* S. Hahn,* H. Kim, J. Heo, J. Han, S. Shin, J. Park, M. K. Cho, D. J. Preston, I. S. Kim,† M. Kim,† and **W.-K. Lee**,† "Strain-Enabled Band Structure Engineering of Multilayer $PtSe_2$ for Water Electrolysis under Ultralow Overpotential," *ACS Nano* **2025**, *19*, 9107 **(Featured on Hongik News)**

12. J. Park,* I. Cho,* H. Jeon,* Y. Lee, D. Lee, J. Zhang, M. K. Cho, D. J. Preston, B. Shong,† I. S. Kim,† and **W.-K. Lee**,† "Conversion of Layered WS_2 Crystals into Mixed-Domain Electrochemical Catalysts by Plasma-Assisted Surface Reconstruction," *Advanced Materials* **2024***, 36,* 2314031 (**Featured on Hongik News, Monthly people)**

13. D. Kang, K. Lee, H. Ryu, S. Shin, A. EG. Gorospe, S. H. Kang, **W.-K. Lee**, W. Shin,† and D. Lee, † "Separator-Driven Synergistic Suppression of Li Dendrite for > 2600 Cycles with Simultaneous 10C rate Capability," *Chemical Engineering Journal* **2024**, 483, 1, 149378.

14. Y. Zhou,* N. Jin,* Y. Ma,* Y. Cui, L. Wang, Y. Kwon, **W.-K. Lee**, W. Zhang,† H. Ge,† and J. Zhang,† "Tube-Sponge-Inspired Hierarchical Electrocatalysts with Boosted Mass- and Electron Transfer for Efficient Oxygen Evolution," *Advanced Materials* **2023**, *35*, 209500.

15. Y. Lee,* S. H. Lee,* S. Hahn,* J. Park, D. Lee, D. J. Preston, I. S. Kim, M. C. Hersam, Y. Kwon,† B. Shong,† and **W.-K. Lee**,† "Strain-Enabled Local Phase Control in Layered $MoTe_2$ for Enhanced Electrocatalytic Hydrogen Evolution," *ACS Energy Letters* **2023**, *8*, 4716 (**Featured on Hongik News, The Fact, Monthly people**)

16. J. Zhang,* Q. Li,* C. Dai,* M. Cheng, X. Hu, H.-S. Kim, H. Yang, D. J. Preston, Z. Li,† X. Zhang,† and **W.-K. Lee,†** "Hydrogel-Based, Dynamically Tunable Plasmonic Metasurfaces with Nanoscale Resolution," *Small* **2022**, *18*, 205057.

17. D. Rhuy,* Y. Lee,* J. Y. Kim, C. Kim, Y. Kwon, D. J. Preston, I. S. Kim, T. W. Odom, K. Kang, D. Lee,† and **W.-K. Lee**,† "Ultraefficient Electrocatalytic Hydrogen Evolution from Strain-Engineered, Multilayer MoS_2," *Nano Letters* **2022***, 22*, 14, 5742 **(Highlighted as Front Cover article, Selected as the "most read" article, Featured on Hongik News, The Fact,** 소비자가 만드는 신문**)**

18. J. Zhang,* **W.-K. Lee**,* R. Tu, D. Rhee, R. Zhao, X. Wang, X. Liu, X. Hu, X. Zhang,† T. W. Odom, and Mi Yan, "Spontaneous Formation of Ordered Magnetic Domains by Patterning Stress," *Nano Letters* **2021***, 21,* 5430-5437.

Harvard Publications

1. **W.-K. Lee**,* D. J. Preston,* M. P. Nemitz, A. K. MacKeith, A. Nagarkar, B. Gorissen, N. Vasios, V. Sanchez, K. Bertoldi, L. Mahadevan, and G. M. Whitesides,† "A Buckling-Sheet Ring Oscillator for Electronics-free, Multimodal Locomotion," *Science Robotics* **2022**, *7*, eabg5812 **(Highlighted in a Focus article by *Science Robotics*:** "Electronics-free soft robot has a nice ring to it," *Science Robotics* **2022**, *7*, eabn6551**).**

2. J. A. Tracz, L. Wille, D. Pathiraja, S. V. Kendre, R. Pfisterer, E. Turett, G. T. Teran, C. K. Abrahamsson, S. E. Root, **W.-K. Lee**, D. J. Preston, H. J. Jiang, G. M. Whitesides, M. P. Nemitz,† "Tube-Balloon Logic for

the Exploration of Fluidic Control Elements," *IEEE Robotics and Automation Letters* **2022**, *7*, 5483-5488.

3. A. Nagarkar,* **W.-K. Lee**,* D. J. Preston, N. Deng, G. M. Whitesides,† and L. Mahadevan,† "Elastic-instability-enabled Locomotion," *PNAS* **2021***, 118*, e2013801118 **(*PNAS* direct submission).**
4. D. J. Preston, H. J. Jiang, V. Sanchez, P. Rothemund, J. Rawson, M. P. Nemitz, **W.-K. Lee**, Z. Suo, Conor J. Walsh, and G. M. Whitesides,† "A Soft Ring Oscillator," *Science Robotics* **2019***, 4,* eaaw 5496.

Northwestern Publications

1. D. Rhee,* J. T. Paci,* S. Deng, **W.-K. Lee**, G. C. Schatz,† and T. W. Odom,† "Soft Skin Layers Enable Area-specific, Multiscale Graphene Wrinkles with Switchable Orientations," *ACS Nano* **2020**, *14,* 166.
2. S. Deng, D. Rhee, **W.-K. Lee**, S. Che, B. Keisham, V. Berry, and T. W. Odom,† "Graphene Wrinkles Enable Spatially-defined Chemistry," *Nano Letters* **2019**, *19,* 5640.
3. **W.-K. Lee** and T. W. Odom,† "Designing Hierarchical Nanostructures from Conformable and Deformable Thin Materials," *ACS Nano* **2019**, *13*, 6170.
4. M. Anni,† D. Rhee and **W.-K. Lee**, "Random Lasing Engineering in Poly-(9-9dioctylfluorene) Active Waveguides Deposited on Wrinkle Corrugated Surfaces," *ACS Applied Materials and Interfaces* **2019**, *11,* 9385.
5. Y. Xue,* **W.-K. Lee**,* Jianghong Yuan, T. W. Odom,† and Y. Huang,† "Mechanics Modelling of Hierarchical Wrinkle Structures from Sequential Release of Pre-strain," *Langmuir* **2018**, *34,* 15749.
6. **W.-K. Lee**, W.-B. Jung, D. Rhee, J. Hu, Y.-A. L. Lee, C. Jacobson, J. Hu, H.-T. Jung, and T. W. Odom,† "Monolithic Polymer Nanoridges with Programmable Wetting Transitions," *Advanced Materials* **2018**, *30*, 1706657.
7. D. Wang, M. R. Bourgeois, **W.-K. Lee**, M. P. Kundson, R. Li, W. Wang, G. C. Schatz, and T. W. Odom,† "Stretchable Nanolasing from Hybrid Quadrupole Plasmons," *Nano Letters* **2018**, *18*, 4549.
8. **W.-K. Lee**,* S. Yu,***** C.J. Engel, D. Rhee, W. Chen,† and T. W. Odom,† "Concurrent Design of Quasi-Random Photonic Nanostructures," *PNAS* **2017***, 114*, 8734 **(*PNAS* direct submission) (Highlighted by over 9 media reports including *Northwestern Engineering News*, *ScienceDaily* and *LaserFocusWorld*)**.
9. W.-B. Jung, K. M. Cho, **W.-K. Lee**, T. W. Odom, and H.-T. Jung,† "Universal Method to Create Hierarchical Wrinkles on Thin-Film Surfaces," *ACS Applied Materials and Interfaces* **2017**, *10*, 1347.
10. D. Rhee, **W.-K. Lee,** and T. W. Odom,† "Crack-free, Soft Wrinkles Enable Switchable Anisotropic Wetting," *Angewandte Chemie International Edition* **2017**, *56*, 6523.
11. A. Paul, M. Stührenberg, S. Chen, D. Rhee, **W.-K. Lee**, T. W. Odom, S. C. Heilshorn, A. Enejder,† "Micro- & Nano-patterned Elastin-like Polypeptide Hydrogels for Patterned Stem Cell Growth," *Soft Matter* **2017**, *13*, 5665.
12. J. T. Paci, C. T. Chapman, **W.-K. Lee**, T. W. Odom, and G. C. Schatz,† "Wrinkles in Polytetrafluoroethylene on Polystyrene: Persistence Lengths and the Effect of Nanoinclusions," *ACS Applied Materials and Interfaces* **2017**, *9*, 9079.
13. S. Yu, Y. Zhang, C. Wang, **W.-K. Lee**, B. Dong, C. Sun, T.W. Odom, W. Chen,† "Characterization and Design of Functional Quasi-Random Nanostructured Materials Using Spectral Density Function," *Journal of Mechanical Design* **2017**, *139*, 07401.

14. **W.-K. Lee**,* J. Kang,***** K.-S. Chen, C.J. Engel, W.-B. Jung, D. Rhee, M.C. Hersam,† and T. W. Odom,† "Multiscale, Hierarchical Patterning of Graphene using Conformal Wrinkling," *Nano Letters* **2016**, *16*, 7121.
15. C.T. Chapman, J. T. Paci, **W.-K. Lee**, C. J. Engel, T. W. Odom, and G. C. Schatz,† "Interfacial Effects on Nanoscale Wrinkling in Gold-Covered Polystyrene," *ACS Applied Materials and Interfaces* **2016**, *8*, 24339.
16. **W.-K. Lee**, W.-B. Jung, S. R. Nagel, and T. W. Odom,† "Stretchable Superhydrophobicity from Monolithic, Three-Dimensional Hierarchical Wrinkles," *Nano Letters* **2016**, *16*, 3774.
17. A. Yang, A. J. Hryn, M. Bourgeois, **W.-K. Lee**, J. Hu, G. C. Schatz, and T. W. Odom,† "Continuous and Reversible Plasmon Mode Engineering," *PNAS* **2016**, *113*, 14201-14206 **(*PNAS* direct submission)**.
18. **W.-K. Lee**, C. J. Engel, M. D. Huntington, J. Hu, and T. W. Odom,† "Controlled Three-Dimensional Hierarchical Structuring by Memory-Based, Sequential Wrinkling," *Nano Letters* **2015**, *15*, 5624 **(Highlighted by *Science*:** "When wrinkling is a good thing," *Science*, **2015**, *349*, 839**)**.

Yonsei Publications

1. H.-K. Jeong,* **W.-K. Lee**,* and D.-S. Seo, "Polarized UV Cured Reactive Mesogens for Fast Switching and Low Voltage Driving Liquid Crystal Device," *Optics Express* **2014**, *22*, 21551.
2. **W.-K. Lee**,* S.-J.Hwang,* M.-J. Cho, H.-G. Park, J.-W. Han, S. Song, J. H. Jang, and D.-S. Seo, "CIS/ZnS Quantum Dots for Self-Aligned Liquid Crystal Molecules with Superior Electro-Optic Properties," *Nanoscale* **2013**, *5*, 193 **(Highlighted as Inside Back Cover article)**.
3. **W.-K. Lee**,* Y.-S. Choi,* Y.-G. Kang, J. Sung, D.-S. Seo, C. Park, "Super-fast Switching of Twisted Nematic Liquid Crystals on 2D Single Wall Carbon Nanotube Networks," *Advanced Functional Materials* **2011**, *21*, 3843 **(Highlighted as Front Cover article)**.
4. B.-Y. Kim, **W.-K. Lee**, Y.-H. Kim, H.-G. Park, T.-K. Park, and D.-S. Seo, "Ion Bombardment-induced Transformation Process on SiN_x Surfaces to Achieve Vertical Alignment of Liquid Crystal Molecules," *Liquid Crystals* **2011**, *38*, 349.
5. B.-Y. Kim, W.-K. lee, Y.-H. Kim, H.-G. Park, B.-Y. Oh, T.-K. Park, J.-M. Han, D.-S. Seo, "Vertically Aligned Liquid Crystal Molecules on a Silicon Nitride Film Treated by Ion-Beam Irradiation," *Thin Solid Films* **2011**, 15, 5165
6. H.-J. Na, J.-W. Lee, **W.-K. Lee**, J.-H. Lim, H.-G. Park, B.-Y. Kim, J.-Y. Hwang, J.-M. Han, and D.-S. Seo, "Titanium Dioxide Surface Modification via Ion-beam Bombardment for Vertical Alignment of Nematic Liquid Crystal," *Optics Letters* **2010**, *35*, 1151
7. B.-Y. Kim, Y.-H. Kim, H.-G. Park, B.-Y. Oh, J.-Y. Hwang, H.-J. Na, **W.-K. Lee**, J.-H. Lim, and D.-S. Seo, "Liquid Crystal Alignment Capabilities on SiN_x Thin Films via Ion-beam Irradiation," *Ferroelectrics* **2010**, *394*, 1.
8. L.-G. Kim, **W.-K. Lee**, B.-Y. Oh, J.-H. Lim, H.-J. Na, H.-G. Park, Y.-H. Kim, B.-Y. Kim, Y.-G. Kang, C.-H. Ok, J.-Y. Hwang, J.-M. Han, and D.-S. Seo, "Low-voltage Driving of Liquid Crystals Vertically Aligned by Ion-beam Bombardment on High-*k* HfO_2 Surface," *Molecular Crystals and Liquid Crystals* **2010**, *529*, 115.
9. **W.-K. Lee**, J.-H. Choi, H.-J. Na, J.-H. Lim, J.-M. Han, J.-Y. Hwang, and D.-S. Seo, "Low Power Operation of Vertically Aligned Liquid-crystal System via Anatase-TiO_2 Nanoparticle Dispersion," *Optics Letters* **2009**, *34*, 3653.

10. H.-J. Na, **W.-K. Lee**, J.-H. Lim, B.-Y. Kim, Y.-H. Kim, C.-H. Ok, and D.-S. Seo, "Directional Behavior of LC on Homogeneous Polyimide Surfaces Induced by Polarized UV Exposure and Rubbing," *Liquid Crystals* **2009**, *37*, 109.
11. J.-H. Lim, B.-Y. Oh, **W.-K. Lee**, K.-M. Lee, H.-J. Na, B.-Y. Kim, J.-M. Han, J.-Y. Hwang, and D.-S. Seo, "Selective Liquid Crystal Molecule Orientation on Ion Beam Irradiated Tantalum Oxide Ultrathin Films," *Applied Physics Letters* **2009**, *95*, 123503.
12. **W.-K. Lee**, B.-Y. Oh, J.-H. Lim, H.-G. Park, B.-Y. Kim, H.-J. Na, and D.-S. Seo, "Vertical Alignment of Liquid Crystals on a Fully Oxidized HfO_2 Surface by Ion Bombardment," *Applied Physics Letters* **2009***, 94*, 223507.
13. B.-Y. Oh, **W.-K. Lee**, Y.-H. Kim, and D.-S. Seo, "Zinc Oxide Nanolevel Surface Transformation for Liquid Crystal Orientation by Ion Bombardment," *Journal of Applied Physics* **2009**, *105*, 054506.
14. H.-G. Park, Y.-H. Kim, B.-Y. Oh, **W.-K. Lee**, B.-Y. Kim, D.-S. Seo, and J.-Y. Hwang, "Vertically Aligned Liquid crystals on a γ-Al_2O_3 Alignment Film using Ion-beam Irradiation," *Applied Physics Letters* **2008**, *93*, 233507.
15 J.P. Kar, M.-C. Jeong, **W.-K. Lee**, J.-M. Myoung, "Fabrication and Characterization of Vertically Aligned ZnMgO/ZnO Nanowire Arrays," *Materials Science and Engineering B* **2008**, *147*, 74.

CONFERENCE PRESENTATIONS

1. "Strain- and Defect Engineered Layered Chalcogenide Electrocatalysts," The Electrochemical Society, oral **2026**, May 24-28, Seattle, USA.
2. "Strain- and Defect Engineering of Layered Transition Metal Chalcogenides for Water Electrolysis," Materials Research Society, oral **2025**, November 30-December 5, Boston, USA.
3. "Functional and Hierarchical Nanoscale Metamaterials," Vannevar Bush Faculty Fellowship 10th Anniversary Program Review, poster **2018**, April 9-10, Washington, D. C., USA.
4. "Concurrent design of quasi-random photonic nanostructures on amorphous silicon thin films," Materials Research Society, oral **2017**, November 27-December 01, Boston, USA.
5. "Surface engineering via bio-inspired, three-dimensional nanowrinkles," SPIE-MRSEC Student Seminar Series, invited talk **2017**, June 5, Evanston, USA.
6. "Multiscale, hierarchical structuring of graphene on a polymer substrate using conformal wrinkling," Materials Research Society, oral **2017**, April 17-21, Phoenix, USA.
7. "Fabrication and dynamic wetting properties of bioinspired, three-dimensional hierarchical wrinkles," Materials Research Society, oral **2016**, November 28-December 02, Boston, USA.
8. "Physical transformation of HfO_2 surfaces for vertical alignment of liquid crystals via ion-beam irradiation: surface image investigation," 12th International Conference on Ferroelectric Liquid Crystals, poster **2009**, August 31-September 04, Zaragoza, Spain.
9. "Low-voltage driving of liquid crystals vertically aligned by ion-beam irradiation on high-k HfO_2/Al_2O_3 double layers," 215th ECS meeting, poster **2009**, May 24-29, San Francisco, USA.
10. "Research of liquid crystal alignment on tantalum oxide by using ion beam irradiation," 215th ECS meeting, poster **2009**, May 24-29, San Francisco, USA.
11. "Directional behavior and orientational mechanism of LC on polyimide surfaces with UV exposure and rubbing treatment," 215th ECS meeting, poster **2009**, May 24-29, San Francisco, USA.
12. "Compensation polymer film for improved viewing angle liquid crystal display," 3DIT, poster **2008**, November 24-25, Seoul, Korea.

13. "Liquid crystal alignment and its characteristics on the NDLC thin film deposited via sputtering," 3DIT, poster **2008**, November 24-25, Seoul, Korea.

TEACHING EXPERIENCE

Instructor for "Mechanical Deformation of Materials", Hongik University, Spring 2021-26
- Holding 2-hour and 1-hour lectures every week

Instructor for "Elasticity and Plasticity of Materials", Hongik University, Fall 2021-26
- Holding a 2-hour lecture every week

Instructor for "Introductory Materials Chemistry", Hongik University, Spring 2021-26
- Holding a 2-hour lecture every week

Instructor for "Materials Properties", Hongik University, Fall 2021-26
- Holding 2-hour lecture every week

Instructor for "Materials Science", Hongik University, Spring 2022
- Holding 2-hour and 1-hour lectures every week

Instructor for "Materials Science LAB", Hongik University, Spring 2022
- Holding 2-hour lecture for experimental guidance every week

Instructor for "Creative Engineering Design and Entrepreneurship", Hongik University, Spring 2021-25
- Holding 2-hour lecture every week

Teaching Assistant for Nanomaterials, Northwestern University, Fall 2017
- Responsibilities included preparation plus revision of teaching content and presentations
- Grading team projects and reports of students
- Holding office hours every week for tutoring

Teaching Assistant for Intro to Materials Science, Northwestern University, Spring 2017
- Responsibilities included grading of homework assignments
- Holding office hours every week for tutoring
- Holding a one-hour lecture every week to assist students in solving homework problems

PRESS RELEASES

1. "Bridge the gap between design and nanomanufacturing," *Engineers Australia*, **2017**.
2. "Nanomanufacturing approach to rapidly optimize and fabricate quasi-random photonic nanostructures," *Nanowerk News*, **2017**.
3. "Simultaneous design and nanomanufacturing speeds up fabrication: Method enhances broadband light absorption in solar cells," *Northwestern Engineering News*, *Nanotechnology Now*, *ScienceDaily*, *EurekAlert!*, **2017.**
4. "Photonic nanostructures by design," *NanotechWeb*, **2017**.
5. "Design + Nanomanufacturing = Optimized Solar Cell Material," *Engineering 360*, **2017**.
6. "Machine learning and wrinkle lithography speed up fabrication of broadband light absorbing surfaces for solar cells," *LaserFocusWorld*, **2017**.
7. "Nanowrinkles are key to stretchable superhydrophobicity," *Nanowerk News*, **2016.**

8. "Sequential wrinkle process creates hierarchically structured materials," *Materials 360 Online*, *Materials Research Society*, **2015.**
9. "When wrinkling is a good thing," *Science*, **2015**, *349*, 839.
10. "3D nanopatterning with memory-based, sequential wrinkling," *Nanowerk News*, **2015**.

LEADERSHIP POSITIONS

2020-21	Whitesides research group, team leader of soft robotics subgroup
2014-18	Odom research group, lab coordinator and safety manager
2011-13	KOLON central research park, Instructor for lab safety and disposal of chemical waste
2012-13	KOLON central research park, product manager of dry film photoresist
2009-10	Yonsei University, Information display device lab, office and lab manager

REFERENCES

Prof. Teri W. Odom
Department of Chemistry, and Materials Science and Engineering, Northwestern University
Email: todom@northwestern.edu
Phone: +1-847-491-7674

Prof. George M. Whitesides
Department of Chemistry and Chemical Biology, Harvard University
Email: gwhitesides@gmwgroup.harvard.edu
Phone: +1-617-495-9430

Prof. Mark C. Hersam
Department of Materials Science and Engineering, Chemistry, Medicine, and Electrical Engineering, Northwestern University
Email: m-hersam@northwestern.edu
Phone: 847-491-2696