

Changhoon Park

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EDUCATION

Yonsei University Seoul, Korea	Ph.D., Mechanical Engineering Advisor: <i>Dr. Jae W. Hahn</i>	2014-2021
Yonsei University Seoul, Korea	B.S., Mechanical Engineering	2010-2014

RESEARCH INTERESTS

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|---------------------|---------------------------|-----------------------|
| • Plasmonics | • Nonlinear optics | • Nanophotonics |
| • Tunable Photonics | • Metasurface | • Optical Sensing |
| • Atomistic Design | • MXenes and 2D materials | • Thermal Engineering |

ACADEMIC AND RESEARCH EXPERIENCE

Postdoctoral Researcher – Drexel University, Philadelphia, PA, USA PI: <i>Dr. Yury Gogotsi</i>	2024-present
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Department of Materials Science and Engineering

- Developed atomistic design strategies for MXenes to tailor optical and thermal properties
- Established protocols for fabricating ultrasmooth films, and NEMS fabrication for nanophotonic devices
- Initiated and led more than 10 collaborative research projects on optics and heat transfers.

Research Professor – Korea University, Seoul, Korea	2022-2024
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Postdoctoral Researcher – Korea University, Seoul, Korea	2021-2022
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PI: *Dr. Myung-Ki Kim*

Nano-Bio-Information-Technology Convergence

- Pioneered MXene plasmonic devices for nonlinear optics and infrared (IR) sensing.
- Developed ultrathin metal film fabrication methods and investigated their unconventional optical properties

Ph.D. Researcher – Yonsei University, Seoul, Korea	2014-2021
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Ph.D. Dissertation: “Integrated infrared signature management with multispectral selective absorber engineered with vectorial diffraction”

- Developed a plasmonic lithography platform for high-resolution nanopatterning
- Designed metasurface for multispectral absorption/emission for IR stealth technology

PUBLICATIONS

First-author publications

1. **Changhoon Park***, Jamal AlHourani*, Yuan Zhang, Jongyoun Kim, James Fitzpatrick, Teng Zhang, Gary Friedmann, and Yury Gogotsi, “Anomalous Microwave Absorption Hysteresis in Ultrathin MXene Films with Confined Water,” *ACS Nano*, ASAP <https://doi.org/10.1021/acsnano.6c07970> (2026).
2. **Changhoon Park***, Jisung Kwon*, Nu-Ri Park, Hyerim Kim, Hyeju Kim, Yury Gogotsi, Chong Min Koo, and Myung-Ki Kim, “Ultrabroadband and Highly Sensitive Short-wave Infrared Molecular Fingerprinting via Acoustic MXene Plasmon,” *Adv. Sci.* e75346 (2026).
3. Tufail Hassan*, **Changhoon Park***, Shabbir Madad Naqvi, Jongyoun Kim, Hyunho Kim, Zubair Khalid, Sungmin Jung, Yury Gogotsi, and Chong Min Koo, “MXenes for Infrared Thermal Management,” *ACS Nano*. 19, 40703 (2025). **(Co-first author)**
4. **Changhoon Park***, Nu-Ri Park*, Jisung Kwon, Hyerim Kim, Yury Gogotsi, Chong Min Koo and Myung-Ki Kim, “Ultrahigh Nonlinear Responses from Acoustic MXene Plasmons in the Short-wave Infrared Range,” *Adv. Mater.* 36, 2309189 (2024).
5. Jagyeong Kim*, **Changhoon Park***, and Jae W. Hahn, “Metal-semiconductor-metal Metasurface for Multiband Infrared Stealth Technology Using Camouflage Color Pattern in Visible Range,” *Adv. Opt. Mater.* 10, 202101930 (2022). **(Co-first author)**
6. **Changhoon Park**, Jagyeong Kim, and Jae W. Hahn, “Integrated Infrared Signature Management with Multispectral Selective Absorber via Single-port Grating Resonance,” *Adv. Opt. Mater.* 9, 202002225 (2021).
7. **Changhoon Park**, Jagyeong Kim, and Jae W. Hahn, “Selective Emitter with Engineered Anisotropic Radiation to Minimize Dual-band Thermal Signature for Infrared Stealth Technology,” *ACS Appl. Mater. Interfaces* 12, 43090 (2020).
8. **Changhoon Park**, Seonghyeon Oh, and Jae W. Hahn, “Theoretical Analysis of High-efficient Dielectric Nanofocusing for the Generation of a Brightness Light Source”, *Sci. Rep.* 9, 8207 (2019).
9. Howon Jung*, **Changhoon Park***, Seonghyeon Oh, and Jae W. Hahn, “Nanoscale 2.5-Dimensional Surface Patterning with Plasmonic Lithography”, *Sci. Rep.* 7, 9721 (2017). **(Co-first author)**
10. **Changhoon Park**, Howon Jung, and Jae W. Hahn, “Characterization of Three-dimensional Field Distribution of Bowtie Aperture Using Quasi-spherical Wave and Surface Plasmon Polaritons”, *Sci. Rep.* 7, 45352 (2017).
11. **Changhoon Park**, Jinhee Jang, and Jae W. Hahn, “Analysis of Line Edge Roughness due to the Stick/slip Motion of a Contact-mode Scanning Probe in Plasmonic Lithography”, *J. Micro Nanolithogr. MEMS MOEMS* 13, 043020 (2014).

***equally contributing first authors**

Co-authored publications

1. Jisung Kwon, **Changhoon Park**, Hyerim Kim, Nu-Ri Park, Chong Min Koo, and Myung-Ki Kim, “Shortwave Infrared Surface Plasmons in Multilayered Two-dimensional $\text{Ti}_3\text{C}_2\text{T}_x$ MXenes,” *2D mater.* 10, 035028 (2023).
2. Dandan Han, **Changhoon Park**, Seonghyeon Oh, Howon Jung, and Jae W. Hahn, “Quantitative Analysis and Modeling of Near-field Lithography: Toward High Quality Pattern in Nanofabrication”, *Nanophotonics* 8, 879 (2019).
3. Dandan Han, **Changhoon Park**, Howon Jung, and Jae W. Hahn, “Calibration of Exposure Dose for Nanoscale Plasmonic Lithography with Microsized Far-field Spot Patterns”, *J. Micromech. Microeng.* 26, 095001 (2016).

SELECTED ORAL AND INVITED TALKS

1. **Changhoon Park** et al., “Programmable 2D Photonics with MXenes: Engineering Light-Matter Interaction through Atomistic Design” **†Invited talk**, Global MXene and 2D Material Conference (GXMC 2026), Suwon, Korea (2026).
2. **Changhoon Park** et al., “Pushing the Limits of Plasmon Confinement in MXenes”, **†Invited talk**, 4th International Conference on MXenes, Chicago, USA (2026).
3. **Changhoon Park** et al., “Epsilon-Near-Zero Photonics with MXene for High Nonlinear Response”, *MRS Fall*, Boston, USA (2025).
4. **Changhoon Park** et al., “MXene Nanophotonics for Extreme Light Confinement in the Near-Infrared Range”, *SPIE Optics and Photonics*, San Diego, USA (2025).
5. **Changhoon Park**, and Yury Gogotsi, Optical Properties and Applications of a Large Family of Metallic 2D Nanosheets–MXenes, *Novel Optical Materials and Applications*, **†Invited talk**, Marseille, France (2025)
6. **Changhoon Park** et al., “Thermal radiation engineering with MXene based selective Emission for Thermal Camouflage”, *SPIE Optics and Photonics*, San Diego, USA (2022).
7. **Changhoon Park** et al., “Extreme Light Localization from MXene Plasmons in Short-Wave Infrared Range”, *CLEO-PR*, Sapporo, Japan (2022).
8. **Changhoon Park**, and Jae W. Hahn, “Light Focusing with Three-Dimensional Bowtie Antenna Suppressing Ohmic Loss”, *SPIE Photonics West*, Sanfrancisco, USA (2019).

PROPOSAL WRITING EXPERIENCE

2026-Current	NSF DOE	\$750,000
Title: Self-Driving Discovery and Co-Design of MXene Memristors for 3D Compute-in-Memory Systems		
Role: Grant writing and project planning		
PIs: Y. Gogotsi, Q. Xia, J. Li, and H. Mosallaei		
2025-Current	NSF DMR	\$722,000
Title: Unlocking New Properties of MXenes: From Optical Response to Novel Electronic Phenomena		
Role: Grant writing and project planning		
PIs: Y. Gogotsi, A. Boltasseva, A. V. Kildishev, V. M. Shalaev		
2024-2025	NSF in Korea Overseas Postdoctoral Fellowship	\$41,486
Title: Ultrafast all-optical modulator with MXene based nanostructure in short-wave infrared regime		
Role: Principal Investigator		
2021-2022	NSF in Korea Domestic Postdoctoral Fellowship	\$41,486
Title: Infrared Spectroscopy for vibrational fingerprint of molecule with MXene plasmonic resonator		
Role: Principal Investigator		

TEACHING AND MENTORING EXPERIENCE

Guest lecturer, Drexel University, 2025

Course: Carbon Nanomaterials (MATE-585)

- Delivered a 1.5-hour guest lecture on electronic and optical properties of carbon nanomaterials and MXenes, expanding the course content beyond its existing curriculum

Teaching Assistant, Drexel University, 2025

Course: Carbon Nanomaterials

- Assisted with course instruction, grading, and student questions in Carbon Nanomaterial class

Senior Design Mentor, Drexel University, 2024

- Mentored undergraduate senior design students on experimental planning, sample fabrication, data analysis, and technical presentation for a project on MXene-based thermal insulation.

Research Mentor, Drexel University, 2024-present

- Mentored a graduate student through experimental design, characterization, data analysis, and manuscript preparation, resulting in a co-first-author publication in *ACS Nano*

Research Mentor, Korea University, 2021-2024

- Mentored graduate students through experimental design, characterization, data analysis, and manuscript preparation, resulting in co-first-author publications in *Adv. Mater.*, and *Adv. Sci.*

ACADEMIC SERVICE

Peer Reviewer, 2021-present

Light: Science & Applications, Journal of the American Chemical Society (JACS), Advanced Functional Materials, ACS Applied Optical Materials

Selection Committee Member, i-MESC Erasmus Mundus Joint Master, 2026

Evaluated and scored applications for admission to Class #22 (2026-2028)

Campus Reviewer for NSF Graduate Research Fellowship Program (GRFP), Drexel University 2026

Reviewed and evaluated NSF GRFP application essays based on the Intellectual Merit and Broader Impacts Criteria