

DONGJIN SEO

[🏠 Homepage](#) / [🔍 Google Scholar](#) / [🐙 GitHub](#) / [✉️ dongjin.seo@yale.edu](mailto:dongjin.seo@yale.edu)

EDUCATION

- [3] **Yale University** Aug 2024 -
Ph.D. in Applied Physics (Academic Advisor: Prof. [Logan G. Wright](#)) Connecticut, USA
- [2] **Korea Advanced Institute of Science and Technology (KAIST)** Feb 2019 - Feb 2021
M.S. in Electrical Engineering (Academic Advisor: Prof. [Min Seok Jang](#)) [thesis] Daejeon, South Korea
- [1] **Korea Advanced Institute of Science and Technology (KAIST)** Feb 2011 - Feb 2019
B.S. in Electrical Engineering Daejeon, South Korea
- On Leave Aug 2014 - May 2016 for National Military Service

JOURNAL

- [5] ASOptimizerTM: optimizing antisense oligonucleotides through deep learning for 2024
IDO1 gene regulation
G Hwang†, M Gwon†, [D Seo](#), DH Kim, K Lee, E kim, M Kang*, J Ryu*. *Molecular Therapy Nucleic Acids*
[paper]
- [4] Sample-efficient inverse design of freeform nanophotonic devices with physics-informed 2024
reinforcement learning
C Park†, S Kim†, W Jeong†, J Park, [D Seo](#), Y Kim, C Park, CY Park*, MS Jang*. *Nanophotonics*
[paper]
- [3] Adjoint Method in Machine Learning: A Pathway to Efficient Inverse Design of Photonic Devices 2024
C Kang†, [D Seo](#)†, S V Boriskina, H Chung*. *Materials & Design*
[paper]
- [2] Structural Optimization of a One-Dimensional Freeform Metagrating Deflector via Deep 2022
Reinforcement Learning *selected as the [Front Cover](#) of 2022 Feb. Issue*
[D Seo](#)†, DW Nam†, J Park, CY Park*, MS Jang*. *ACS Photonics*
[paper] [source code] [press]
- [1] Inverse design of organic light-emitting diode structure based on deep neural networks 2021
S Kim, JM Shin, J Lee, C Park, S Lee, J Park, [D Seo](#), S Park, CY Park, MS Jang*. *Nanophotonics*
[paper]

PREPRINTS

- [2] Physics-guided and fabrication-aware structural optimization using diffusion models
[D Seo](#)†, S Um†, S Lee, JC Ye*, H Chung*.
[arxiv] [source code]
- [1] Wave Interpolation Neural Operator: Interpolated Prediction of Electric Fields Across Untrained Wavelengths
[J Seo](#)†, C Kang†, [D Seo](#), H Chung.
[arXiv]

CONFERENCE

- [9] [poster] Physics-guided Optimization of Photonic Structures using Denoising Diffusion Dec 2024
Probabilistic Models
[D Seo](#)†, S Um†, S Lee, J Ye, H Chung. *NeurIPS 2024 Workshop: Machine Learning and the Physical Sciences*
[extended abstract]
- [8] [poster] Wave Interpolation Neural Operator: Interpolated Prediction of Electric Fields Across Dec 2024
Untrained Wavelengths

- J Seo†, C Kang†, D Seo, H Chung. *NeurIPS 2024 Workshop: Data-driven and Differentiable Simulations*
[\[extended abstract\]](#)
- [7] [poster] Adjoint sensitivity analysis based photonic structure efficiency prediction and data augmentation Aug 2024
 C Kang†, D Seo†, S V Boriskina, H Chung. *CLEO-PR 2024*
[\[proceeding\]](#)
- [6] [poster] High-Speed Multiwavelength Adjoint Optimization with Surrogate Solver Aug 2024
 J Seo†, C Kang†, D Seo, H Chung. *CLEO-PR 2024*
[\[proceeding\]](#)
- [5] [poster] Physics-guided Diffusion Models for Inverse Design Aug 2024
D Seo†, S Um†, J Ye, H Chung. *CLEO-PR 2024*
[\[proceeding\]](#)
- [4] [poster] Contextualized and Aligned Audio-Text Fusion Models for Emotion Recognition Dec 2023
 S Choi, Y Kwon, D Seo. *KCC 2023*
[\[proceeding\]](#)
- [3] [oral] Adjoint Method for Data Augmentation of Photonic Structures Aug 2023
D Seo, C Kang, H Chung. *Optica Imaging Congress*
[\[proceeding\]](#)
- [2] [oral] Deep reinforcement learning enables freeform structure optimization of 1D metagrating deflector Oct 2022
D Seo, DW Nam, J Park, CY Park, MS Jang. *SPIE Optical Engineering + Applications*
[\[abstract\]](#)
- [1] [poster] Realization of large scale graphene plasmonic resonator using epsilon-near-zero substrate Jul 2022
 S Kim, S Baek, SY Min, H Ha, D Seo, J Kim, G Lee, B Min, MS Jang. *NANO KOREA 2022*
[\[abstract\]](#)

PATENT

- [10] Method and system for psychological test based on brain signal analysis
 Korean Patent / Registration No. 10-2741867-0000 / Registration Date 2024.12.13 [\[patent\]](#)
 Inventors: D Seo, T Hwang.
- [9] Method and system for interactive psychological test
 Korean Patent / Registration No. 10-2738489-0000 / Registration Date 2024.11.29 [\[patent\]](#)
 Inventors: S Choi, D Seo, T Hwang.
- [8] Device and method for placing classroom placements using student personality and grade data and machine learning technology
 Korean Patent / Registration No. 10-2671422-0000 / Registration Date 2024.05.28 [\[patent\]](#)
 Inventors: S Choi, D Seo, T Hwang.
- [7] Method for optimizing classroom structure to achieve maximum learning efficiency utilizing policy-based reinforcement learning
 Korean Patent / Registration No. 10-2671423-0000 / Registration Date 2024.05.28 [\[patent\]](#)
 Inventors: D Seo, T Hwang.
- [6] Devices, methods and programs for sampling a group of respondents based on artificial intelligence
 Korean Patent / Registration No. 10-2663479-0000 / Registration Date 2024.04.30 [\[patent\]](#)
 Inventors: Y Kwon, S Choi, D Seo, T Hwang.
- [5] Method and System for Determining Psychological State based on Large Language Model
 Korean Patent / Registration No. 10-2624653-0000 / Registration Date 2024.01.09 [\[patent\]](#)
 Inventors: S Choi, D Seo, T Hwang.

- [4] Server and Method for Generating Personality Test using Query Response Network based on Language Model
Korean Patent / Registration No. 10-2591769-0000 / Registration Date 2023.10.17 [\[patent\]](#)
Inventors: Y Kwon, S Choi, D Seo, T Hwang.
- [3] Method for Sampling Process of Personality Test Using Question and Answer Network Representing Group of Respondents Based on BERT
Korean Patent / Registration No. 10-2583818-0000 / Registration Date 2023.09.22 [\[patent\]](#)
Inventors: Y Kwon, S Choi, D Seo, T Hwang.
- [2] Method and System for Designing Optimal Sequence of RNA Therapeutics
Korean Patent / Registration No. 10-2546977-0000 / Registration Date 2023.06.20 [\[patent\]](#)
Inventors: D Seo, M Kang, G Hwang, K Lee.
- [1] Method and System for Designing RNA Therapeutics
Korean Patent / Registration No. 10-2499895-0000 / Registration Date 2023.02.09 [\[patent\]](#)
Inventors: D Seo, M Kang, G Hwang, K Lee.

HONORS AND AWARDS

- [7] Kwanjeong Scholarship [\[website\]](#) 2024 - 2030
- Korean scholarship to support doctoral program
- [6] 2nd Place of ‘2023 Corning AI Challenge’ [\[website\]](#) Dec 2023
- [5] 6th Place of ‘AI Grand Challenge: Policy Assistance AI’ Second Round [\[press\]](#) Dec 2023
- hosted by *the Ministry of Science and ICT of South Korea*
- Position: Team Leader
- Subject: Understanding and creating tables and figures, writing reports with a clear hierarchy using AI
- [4] 3rd Place of ‘AI Grand Challenge: Policy Assistance AI’ [\[website\]](#) [\[press\]](#) Jul 2023
- hosted by *the Ministry of Science and ICT of South Korea*
- Position: Team Leader
- Subject: Developing an AI for the interpretation of governmental documents using NLP and CV techniques
- [3] 2022 Talent Award of Korea [\[website\]](#) [\[press\]](#) Dec 2022
- Award for talented people in South Korea
- bestowed by *the Deputy Prime Minister and Minister of Education of South Korea*
- [2] Best Paper Award (Honorable Mention) [\[website\]](#) Sep 2017
- bestowed by *the School of Humanities & Social Science, KAIST*
- [1] Exemplary Soldier Award May 2016
- bestowed by *Senior Superintendent of the Guard of Government Complex Daejeon*
(one person per platoon, Top 5%)

SERVICE

- [2] Reviewer at *NeurIPS ML4PS Workshop* 2024
- [1] Reviewer for *Nanophotonics* 2024