DONGJIN SEO

◇ E-mail: mildstudent@gmail.com ◇ Homepage ◇ Google Scholar ◇ GitHub ◇ LinkedIn

EDUCATION

[2] **Korea Advanced Institute of Science and Technology (KAIST)** **2019 - 2021**
M.S. in Electrical Engineering (Academic Advisor: Prof. Min Seok Jang) [thesis] Daejeon, South Korea
- Prediction and Optimization of Photonic Structures with Deep Learning

[1] **Korea Advanced Institute of Science and Technology (KAIST)** **2011 - 2019**
B.S. in Electrical Engineering Daejeon, South Korea
- Cleanroom Experience (Photolithography, Etching, Development)

CAREER

[6] **EIDL @ Hanyang University** [website] **Sep 2023 -**
- Position: Senior Researcher (Supervisor: Prof. Haejun Chung)
- Subject: Deep Learning and Nanophotonics Research

[5] **Glorang (Education Startup Company)** [website] **May 2022 - Sep 2023**
- Position: Team Lead (AI team)
- Subject: Applying Deep Learning Algorithms to Education Industry

[4] **Spidercore (AI & Biology Startup Company)** [website] **Dec 2021 - May 2022**
- Position: Researcher (AI team)
- Subject: Search for Biomarkers (e.g. ASO candidates) via Deep Learning Technology

[3] **KC ML2 (AI & Semiconductor Company)** [website] **Feb 2021 - Aug 2021**
- Position: Researcher
- Subject: Deep Learning for Inverse Design

[2] **SK Hynix (Semiconductor Company)** [website] **Jun 2018 - Aug 2018**
- Position: Intern (QLC Device Team)
- Subject: Measurement and Test of NAND Flash Device

[1] **Cheesecake Studio (Startup Company)** **April 2016 - Jan 2017**
- Position: Chief Executive Officer, Founder
- Subject: Writing Music with AI

PUBLICATION (INTERNATIONAL)

[2] **Structural Optimization of a One-Dimensional Freeform Metagrating Deflector via Deep Reinforcement Learning ✯** **2022**
D Seo†, DW Nam†, J Park, CY Park*, MS Jang*. *ACS Photonics* [paper] [press]
✯ selected as the [Front Cover] of 2022 Feb. Issue

[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]

PUBLICATION (DOMESTIC)

[1] **Contextualized and Aligned Audio-Text Fusion Models for Emotion Recognition** **2023**
S Choi, Y Gwon, D Seo*. *KCC 2023 Conference* [paper]

PUBLICATION UNDER REVIEW

[3] **ASOptimizer^{TM}: optimizing antisense oligonucleotides through deep learning for IDO1 gene regulation**
G Hwang†, M Gwon†, D Seo, DH Kim, K Lee, E kim, M Kang*, J Ryu*.

[2] **Physics-informed Reinforcement Learning for the Optimization of the One-dimensional Beam Deflectors**
C Park†, S Kim†, W Jeong†, J Park, D Seo, Y Kim, C Park, CY Park*, MS Jang*.
arXiv:2306.04108 [physics.comp-ph] [preprint]

[1] **Multi-task Learning for Improved Link Prediction in Protein-Protein Interaction Networks**
J Hwang†, G Hwang†, D Seo, H Lee, M Kang*.

PUBLICATION UNDER PREPARATION

[3] **A3SA: Advanced Augmentation via Adjoint Sensitivity Analysis**
C Kang†, D Seo†, H Chung*.

[2] **Action Branching Architectures of Deep Reinforcement Learning for Multi-dimensional Metasurface Design**
D Seo, H Chung*.

[1] **Physics-informed and Conditional Optimization of Photonic Structures using Diffusion Models**
D Seo, H Chung*.

ORAL PRESENTATION

[2] **Adjoint Method for Data Augmentation of Photonic Structures** **Aug 2023**
D Seo, C Kang, H Chung. *Optica Imaging Congress*

[1] **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* [video]

PATENT

[2] **METHOD AND SYSTEM FOR DETERMINING OPTIMAL SEQUENCE OF RNA THERAPEUTICS** [patent] **2023**
Korean Patent / Registration No. 10-2546977-0000 / Registration Date 2023.06.20
Inventors: D Seo, M Kang, G Hwang, K Lee.

[1] **METHOD AND SYSTEM FOR DESIGNING RNA THERAPEUTICS** [patent] **2023**
Korean Patent / Registration No. 10-2499895-0000 / Registration Date 2023.02.09
Inventors: D Seo, M Kang, G Hwang, K Lee.

SELECTED RESEARCH EXPERIENCE

[5] **Collaborative Researcher at Hanyang University** **Sep 2022 - Sep 2023**
- performed collaborative research and provided mentorship and guidance to students
- Subject: Deep Learning and Data Science Approach for Photonics Devices
- Skills acquired: Mentoring, Meep Simulation

[4] **Venture Research Program for Master's and PhD Students in the College of Engineering, KAIST** **May 2020 - Dec 2020**
- Subject: Inverse Design of Manufacturable 2D Plasmonic Metasurface
- Skills acquired: RCWA Simulation, Reinforcement Learning, Deep Learning

[3] **Commisioned Research by Electronics and Telecommunications Research Institute (ETRI)** **April 2020 - Nov 2020 / April 2019 - Nov 2019**

- Subject: Developing a Simulation for the Light Structure of a Transparent Photoswitch Sensor
- Skills acquired: Lumerical FDTD Simulation, Synopsys LightTools (Ray Optics) Simulation

[2] **Undergraduate Research Program (URP) at KAIST** **2014 Spring**
- Advisor: Prof. Wonhee Lee
- Subject: Thermal Conduction Pressure Gauge based on Mean-free-path Reduction in Nanostructure
- Skills acquired: Cleanroom Skills such as Photolithography, Plasma Etching, Development, CAD of PR Mask

[1] **Undergraduate Research at KAIST** **2013 Summer**
- Advisor: Prof. Yong-hee Lee
- Subject: Photonic Crystal Simulation with MPB(MIT Photonic Bands) Program
- Skills acquired: Photonic Crystal Simulation

HONORS AND AWARDS

[4] **Winning Team of 'AI Grand Challenge: Policy Assistance AI'** [website] **July 2023**
- hosted by *the Ministry of Science and ICT of South Korea*
- Subject: Developing an AI for the interpretation of governmental documents using NLP and CV techniques

[3] **2022 Korea Talent Award** [website] [press] **Dec 2022**
- 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 *the Guard of Government Complex Daejeon* (one person per platoon, Top 5%)

LANGUAGE PROFICIENCY

TOEFL: 106 Test Date: **10 May 2023**

SKILLS

Deep Learning Theory
Programming in Python
Autograd Library (Pytorch, JAX)
Nanofabrication and Cleanroom Experience
Photonics
PCB Design and Wire Bonding
Teaching and Mentoring
Creativity and Love for Research

ADDITIONAL EXPERIENCE

[2] **DIYA (Do It Yourself AI)** [website] [GitHub] [YouTube] **Feb 2021 -**
- Korean Nationwide AI Study Club
- Club President since Feb 2022

[1] **Military Service** **Aug 2014 - May 2016**
- served as an Auxiliary Police
- was awarded an Exemplary Soldier Award from the troop