

# Seonwoo Min

Seoul, Republic of Korea

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“Sometimes you win, Sometimes you learn.”

## Work Experience

### Amazon - AWS Health AI

Applied Scientist

Seattle, United States

(Expected) Oct 2023 -

### NAVER Cloud - Hyperscale AI Information Extraction Team

Research Intern

Seongnam, South Korea

May 2023 - Sep 2023

- Uncertainty Estimation for Large Language Models

### LG AI Research - Fundamental Research Laboratory

Research Scientist

Magok, South Korea

Aug 2021 - Sep 2022

- Manager: Prof. Moontae Lee and Prof. Honglak Lee
- Cross-Modality Supervision for Domain Generalization
- Transformers for (Molecular) Graphs

### NAVER Clova - Optical Character Recognition Team

Research Intern

Seongnam, South Korea

Jul 2019 - Aug 2019

- Advisor: Seunghyun Park
- Self-Supervised Training of Protein Language Models

## Education

### Seoul National University

Ph.D. in Electrical and Computer Engineering

Seoul, South Korea

Mar 2015 - Aug 2021

- Data Science & Artificial Intelligence Laboratory (Advisor: Prof. Sungroh Yoon)
- Representation Learning for Biological Sequence Data

B.S. in Electrical and Computer Engineering

Mar 2011 - Feb 2015

- Cum Laude (GPA: 3.64/4.3)

## Selected Publications

Grounding Visual Representations With Texts for Domain Generalization

ECCV 2022

**Seonwoo Min**, Nokyoung Park, Siwon Kim, Seunghyun Park, Jinkyu Kim

TargetNet: Functional microRNA Target Prediction With Deep Neural Networks

Bioinformatics 2022

**Seonwoo Min**, Byunghan Lee, Sungroh Yoon

Pre-training of Protein Sequence Representations With Structural Information

IEEE Access 2021

**Seonwoo Min**, Seunghyun Park, Siwon Kim, Hyun-Soo Choi, Sungroh Yoon

MLCB Workshop 2019 (**Oral**)

Deep Learning Improves Prediction of CRISPR-Cpf1 Guide RNA Activity

Nature Biotechnology 2018

Hui Kwon Kim\*, **Seonwoo Min\***, Myungjae Song, Soobin Jung, Jae Woo Choi, Younggwang Kim, Sangeun Lee, Sungroh Yoon, Hyongbum Henry Kim (**\*Co-first Authors**)

ISMB Highlight Track 2018 (**Oral**)

200+ Citations

Deep Learning in Bioinformatics

Briefings in Bioinformatics 2017

**Seonwoo Min**, Byunghan Lee, Sungroh Yoon

1500+ Citations

## Awards, Honors, and Scholarships

### Awards

Winner (6/4-lead) & Runner-up (12/3/2-lead)	PhysioNet/Computing in Cardiology Challenge	2021
Nomination Award	Schmidt Science Fellowship	2021
<b>BK21 Plus Outstanding Researcher Award</b>	<b>Minister of Education, South Korea</b>	<b>2020</b>
National R&D Excellence Top 100 Award	Ministry of Science and ICT, South Korea	2019
Travel Award	Neural Information Processing Systems LMRL	2019
Research Excellence Award	Biological Research Information Center, South Korea	2018
Outstanding Highly-cited Paper Award	Electrical and Computer Engineering Department, SNU	2018
Distinguished TA Award	Innovation Center for Engineering Education, SNU	2018
<b>Nomination Award</b>	<b>Microsoft Research Asia Fellowship</b>	<b>2018</b>
Highly-cited Paper Paper Award	Briefings in Bioinformatics, Oxford University Press	2017
Travel Award	Neural Information Processing Systems	2017
Gold Award (Individual) & Silver Award (Team)	Korea University Ski Team Association Championship	2015

### Honors

Chief Graduate Student	Data Science & Artificial Intelligence Laboratory, SNU	2020
Assistant Chief Graduate Student	Data Science & Artificial Intelligence Laboratory, SNU	2019
Graduate Student of the Year	Data Science & Artificial Intelligence Laboratory, SNU	2018
<b>Captain</b>	<b>Seoul National University Ski Team</b>	<b>2015</b>

### Scholarships

<b>Global Ph.D. Fellowship (~ 100,000\$)</b>	<b>National Research Foundation of Korea</b>	<b>2016 - 2020</b>
Global Capability Enhancement Program (~ 6,000\$)	National Research Foundation of Korea	2018 - 2019
National Science Scholarship (~ 25,000\$)	Korea Student Aid Foundation	2011 - 2014

## Academic Activities

### Invited Talks

Open Tech Seminar	LG AI Research	Dec 2021
Summer Conference	Korean Institute of Electronics and Information Engineers	Jun 2018
Korea Computer Congress	Korean Institute of Information Scientists and Engineers	Jun 2018
Invited Seminar	Korea Institute of Radiology & Medical Sciences	Sep 2017
Bioinformatics Research Exchange	Bioinformatics Institute of Seoul National University	Apr 2017
Invited Seminar	Laboratory of Genome Editing, Yonsei University	Dec 2016

### Reviewer

International Conference on Learning Representations		2021 - 2023
International Conference on Machine Learning	Top Reviewer in 2020	2020 - 2023
Neural Information Processing Systems	Top Reviewer in 2019	2019 - 2023
Journal of Chemoinformatics		2023
Methods		2017 & 2021

### Teaching Assistance

Design Project for Electrical Devices & Systems @ SNU		Spring 2021
Design Project for Electrical Devices & Systems @ SNU		Fall 2019
Design Project for Electrical Devices & Systems @ SNU		Spring 2019
IoT · Artificial Intelligence · Big Data @ SNU	Head TA	Fall 2018
Deep Learning @ SNU		Fall 2017
Biocomputation @ SNU		Fall 2015

## Republic of Korea Patents

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Deep Learning Based System for Evaluating the RNA-Guided Nuclease Activity  
Hui Kwon Kim\*, **Seonwoo Min**\*, Myungjae Song, Soobin Jung, Sungroh Yoon, and Hyongbum Kim

Sept 2019

System and Method for Generating Sequences of Personal Authentication  
Ho Bae, **Seonwoo Min**, and Sungroh Yoon

Sept 2019

## All Publications

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### Conferences

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Pure Transformers Are Powerful Graph Learners  
Jinwoo Kim, Dat Tien Nguyen, **Seonwoo Min**, Sungjun Cho, Moontae Lee, Honglak Lee, Seunghoon Hong

NeurIPS 2022

Transformers Meet Stochastic Block Models  
Sungjun Cho, **Seonwoo Min**, Jinwoo Kim, Moontae Lee, Honglak Lee, Seunghoon Hong

NeurIPS 2022

Grounding Visual Representations With Texts for Domain Generalization  
**Seonwoo Min**, Nokyoung Park, Siwon Kim, Seunghyun Park, Jinkyu Kim

ECCV 2022

Towards High Generalization Performance on Electrocardiogram Classification  
Hyeongrok Han, Seongjae Park, **Seonwoo Min**, Hyun-Soo Choi, Eunji Kim, Hyunki Kim, Sangha Park, Jinkook Kim, Junsang Park, Junho An, Kwanglo Lee, Wonsun Jeong, Sangil Chon, Kwonwoo Ha, Myungkyu Han, Sungroh Yoon  
Winner (6, 4-lead) and Runner-up (12, 3, 2-lead) in PhysioNet Challenge

Computing in Cardiology 2021

Bag of Tricks for Electrocardiogram Classification With Deep Neural Networks  
**Seonwoo Min**, Hyun-Soo Choi, Hyeongrok Han, Minji Seo, Jin-Kook Kim, Junsang Park, Sunghoon Jung, Il-Young Oh, Byunghan Lee, Sungroh Yoon  
6th Place in PhysioNet Challenge

Computing in Cardiology 2020

Deep Recurrent Neural Network-Based Identification of Precursor MicroRNAs  
Seunghyun Park, **Seonwoo Min**, Hyun-Soo Choi, Sungroh Yoon  
**100+ Citations**

NeurIPS 2017

Neural Universal Discrete Denoiser  
Taesup Moon, **Seonwoo Min**, Byunghan Lee, Sungroh Yoon

NeurIPS 2016

### Journals

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Massively Parallel Evaluation of the Activities and Specificities of 17 Small Cas9s  
Sang-Yeon Seo, **Seonwoo Min**, Sungtae Lee, Jung Hwa Seo, Jinman Park, Hui Kwon Kim, Myungjae Song, Dawoon Bae, Sung-Rae Cho, Hyongbum Henry Kim

Nature Methods 2023

Deep Learning to Predict the Editing Efficiencies and Outcomes of Diverse Base Editors  
Nahye Kim, Sungchul Choi, Sungjae Kim, Myungjae Song, Jung Hwa Seo, **Seonwoo Min**, Jinman Park, Sung-Rae Cho, Hyongbum Henry Kim

Nature Biotechnology 2023

Sniper2L, a High-Fidelity Cas9 Variant With High Activity  
Young-hoon Kim, Nahye Kim, Ikenna Okafor, Sungchul Choi, **Seonwoo Min**, Joonsun Lee, Keunwoo Choi, Janice Choi, Vinayak Harihar, Youngho Kim, Jin-Soo Kim, Jungjoon K. Lee, Taekjip Ha, Hyongbum Henry Kim

Nature Chemical Biology 2023

Improving Generalization Performance of Electrocardiogram Classification Models  
Hyeongrok Han, Seongjae Park, **Seonwoo Min**, Hyun-Soo Choi, Eunji Kim, Hyunki Kim, Sangha Park, Jinkook Kim, Junsang Park, Junho An, Kwanglo Lee, Wonsun Jeong, Sangil Chon, Kwonwoo Ha, Myungkyu Han, Sungroh Yoon

Physiological Measurement 2023

TargetNet: Functional microRNA Target Prediction With Deep Neural Networks  
**Seonwoo Min**, Byunghan Lee, Sungroh Yoon

Bioinformatics 2022

## DNA Privacy: Analyzing Malicious DNA Sequences Using Deep Neural Networks

TCBB 2022

Ho Bae, **Seonwoo Min**, Hyun-Soo Choi, Sungroh Yoon

## Generation of a More Efficient Prime Editor 2 by the Rad51 DNA-Binding Domain

Nature Communications 2021

Myungjae Song, Jung Min Lim, **Seonwoo Min**, Jeong-Seok Oh, Dong Young Kim, Jae-Sung Woo, Hiroshi Nishimasu, Sung-Rae Cho, Sungroh Yoon, Hyongbum Henry Kim

## Pre-training of Protein Sequence Representations With Structural Information

IEEE Access 2021

**Seonwoo Min**, Seunghyun Park, Siwon Kim, Hyun-Soo Choi, Sungroh Yoon

MLCB Workshop 2019 (**Oral**)

## Protein Transfer Learning Improves Identification of Heat Shock Protein Families

PLOS ONE 2021

**Seonwoo Min**, Hyungi Kim, Byunghan Lee, Sungroh Yoon

## Learned Embeddings From Deep Learning to Visualize and Predict Protein Sets

Current Protocols 2021

Christian Dallago, Konstantin Schütze, Michael Heinzinger, Tobias Olenyi, Maria Littmann, Amy X. Lu, Kevin K. Yang, **Seonwoo Min**, Sungroh Yoon, James T. Morton, Burkhard Rost

NeurIPS LMRL Workshop 2020

**50+ Citations**

## Recording of Temporal Information About Biological Events Using Cas9

Cell 2021

Jihye Park, Jung Min Lim, Seok-Jae Heo, Jinman Park, Yoojin Chang, Hui Kwon Kim, Dongmin Jung, Ji Hea Yu, **Seonwoo Min**, Sungroh Yoon, Sung-Rae Cho, Inkyung Jung, Taeyoung Park, Hyongbum Henry Kim

## Predicting the Efficiency of Prime Editing Guide RNAs in Human Cells

Nature Biotechnology 2020

Hui Kwon Kim, GooSang Yu, Jinman Park, **Seonwoo Min**, Sungtae Lee, Sungroh Yoon, Hyongbum Henry Kim

**100+ Citations**

## Prediction of the Sequence-Specific Cleavage Activity of Cas9 Variants

Nature Biotechnology 2020

Nahye Kim, Hui Kwon Kim, Sungtae Lee, Jung Hwa Seo, Jae Woo Choi, Jinman Park, **Seonwoo Min**, Sungroh Yoon, Sung-Rae Cho, Hyongbum Henry Kim

**100+ Citations**

## Sequence-Specific Prediction of the Efficiencies of Adenine and Cytosine Base Editors

Nature Biotechnology 2020

Myungjae Song, Hui Kwon Kim, Sungtae Lee, Younggwang Kim, Sang-Yeon Seo, Jinman Park, Nahye Kim, Jae Woo Choi, Hyewon Jang, Jeong Hong Shin, **Seonwoo Min**, Jhejiu Quan, Jihun Kim, Hoon-Chul Kang, Sungroh Yoon, Hyongbum Henry Kim

**50+ Citations**

## High-Throughput Analysis of xCas9, SpCas9-NG and SpCas9 in Human Cells

Nature Biomedical Engineering 2020

Hui Kwon Kim, Sungtae Lee, Younggwang Kim, Jinman Park, **Seonwoo Min**, Jae Woo Choi, Tony Huang, Sungroh Yoon, David Liu, Hyongbum Henry Kim

**50+ Citations**

## SpCas9 Activity Prediction by DeepSpCas9 With High Generalization Performance

Science Advances 2019

Hui Kwon Kim, Younggwang Kim, Sungtae Lee, **Seonwoo Min**, Jung Yoon Bae, Jae Woo Choi, Jinman Park, Dongmin Jung, Sungroh Yoon, Hyongbum Henry Kim

**150+ Citations**

## Learning-Based Instantaneous Drowsiness Detection Using Wired and Wireless EEG

IEEE Access 2019

Hyun-Soo Choi, **Seonwoo Min**, Siwon Kim, Ho Bae, Jee-Eun Yoon, Inha Hwang, Dana Oh, Chang-Ho Yun, Sungroh Yoon

## Deep Learning Improves Prediction of CRISPR-Cpf1 Guide RNA Activity

Nature Biotechnology 2018

Hui Kwon Kim\*, **Seonwoo Min\***, Myungjae Song, Soobin Jung, Jae Woo Choi, Younggwang Kim, Sangeun Lee, Sungroh Yoon, Hyongbum Henry Kim (**\*Co-first Authors**)

ISMB Highlights Track 2018 (**Oral**)

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## Deep Learning in Bioinformatics

Briefings in Bioinformatics 2017

**Seonwoo Min**, Byunghan Lee, Sungroh Yoon

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