

Sunmook Choi, 최선묵

felixchoi@korea.ac.kr

EDUCATION	M.S. in Mathematics, Korea University • Advisor: Professor Seungsang Oh • GPA: 4.5 / 4.5 B.S. in Mathematics, Korea University • Overall GPA: 4.3 / 4.5, Major GPA: 4.36 / 4.5 • Mandatory Military Service (Auxiliary Police)	Mar. 2022 – Aug. 2024 Mar. 2016 – Feb. 2022 Jun. 2017 – Feb. 2019
RESEARCH INTERESTS	• Enumerative Combinatorics • Theoretical Aspects of Data Science and Machine Learning • Deep Learning, Deep Reinforcement Learning, Bayesian Machine Learning	
PUBLICATIONS	Refereed Journal Publications [1] S. Choi , S. Lee and S. Oh, <i>Augmented Aztec bipyramid and dicube tilings</i> , Discrete Mathematics 347 (1) (2024) 113735, doi: 10.1016/j.disc.2023.113735 . Refereed Conference Publications [2] S. Choi , S. Chung, S. Lee, S. Han, T. Kang, J. Seo, I.-Y. Kwak and S. Oh, <i>TB-ResNet: Bridging the gap from TDNN to ResNet in Speaker Verification with Temporal-Bottleneck Enhancement</i> , Proceedings of the 49th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Seoul (2024) (accepted) [3] S. Han*, T. Kang*, S. Choi* , J. Seo, S. Chung, S. Lee, S. Oh and I.-Y. Kwak, <i>CAU KU deep fake detection system for ADD 2023 challenge</i> , Proceedings of IJCAI 2023 Workshop on Deepfake Audio Detection and Analysis, Macao, S.A.R (2023) 23-30. [link] (*: equal contribution) [4] I.-Y. Kwak, S. Choi , J. Yang, Y. Lee, S. Han and S. Oh, <i>Low-quality Fake Audio Detection through Frequency Feature Masking</i> , Proceedings of the 1st International Workshop on Deepfake Detection for Audio Multimedia (DDAM '22), New York (2022) 9-17, doi: 10.1145/3552466.3556533 . [5] S. Choi , I.-Y. Kwak and S. Oh, <i>Overlapped Frequency-Distributed Network: Frequency-Aware Voice Spoofing Countermeasure</i> , Proceedings of Interspeech 2022, Incheon, Korea (2022) 3558-3562, doi: 10.21437/Interspeech.2022-657 . [6] S. Choi , S. Oh, J. Yang, Y. Lee and I.-Y. Kwak, <i>Light-weight Frequency Information Aware Neural Network Architecture for Voice Spoofing Detection</i> , Proceedings of 2022 26th International Conference on Pattern Recognition (ICPR), Montreal (2022) 477-483, doi: 10.1109/ICPR56361.2022.9956079 .	
PRESENTATION	Oral Presentations • Aztec bipyramid and dicube tilings, <i>Knots and Spatial Graphs 2023</i> , KAIST, Daejeon Korea. • Aztec bipyramid and dicube tilings, <i>2022 Global KMS International Conference</i> , Korean Mathematical Society (KMS), Seoul Korea. Poster Presentations • Overlapped Frequency-Distributed Network: Frequency-Aware Voice Spoofing Countermeasure, <i>Interspeech 2022</i> , Incheon Korea • Light-weight Frequency Information Aware Neural Network Architecture for Voice Spoofing Detection, <i>ICPR 2022</i> , Montreal Quebec Canada Invited Talk • My Know-how of TF Tutorial based on Problem Solving, <i>Autumn 2023 Tutorial TF Workshop</i> (online), Center for Teaching and Learning, Korea University	

RESEARCH EXPERIENCE	Joint research on drug discovery with DRL (Researcher) Jan. 2023 – Present	
	<ul style="list-style-type: none"> Description: Design potent and safe drug candidates through DRL algorithms Principal Investigator: Hyun-Kil Shin (Korea Institute of Toxicology) * H.-K. Shin, S. Choi, S. Lee and S. Oh, <i>Deep reinforcement learning to design drug molecules with improved efficacy and safety</i> (working title) 	
	Joint research on three-dimensional tessellation (Researcher) Feb. 2022 – Present	
	<ul style="list-style-type: none"> Description: Construct an enumeration method of dicube tilings of three-dimensional polycubes Principal Investigator: Seungsang Oh (Korea University) * S. Choi, S. Lee and S. Oh, <i>Variants of augmented Aztec bipyramids and dicube tilings</i> (preprint) 	
	Joint research on audio domains with deep learning (Researcher) Feb. 2021 – Present	
	<ul style="list-style-type: none"> Description: Design audio spoofing countermeasure system, automatic speaker verification system, audio data augmentation methods Principal Investigator: Il-Youp Kwak (Chung-Ang University), Seungsang Oh (Korea University) * T. Kang, S. Han, S. Choi, J. Seo, S. Chung, S. Lee, S. Oh and I.-Y. Kwak, <i>Experimental Study: Enhancing Voice Spoofing Detection Models with wav2vec 2.0.</i> (preprint) * S. Han, S. Choi, T. Kang, J. Yang, Y. Lee, S. Oh, I.-Y. Kwak, <i>Frequency Feature Masking Augmentation for Voice Spoofing Detection.</i> (preprint, Journal ver. of [3]) 	
	Veritas Program (REU), Korea University	
	<ul style="list-style-type: none"> Introduction to Deep Learning, supervised by Professor Seungsang Oh Introduction to Mathematica, supervised by Professor Seong-Deog Yang Introduction to Group theory, supervised by Professor Sangjib Kim 	May. 2020 – Jan. 2021 Jan. 2017 – Feb. 2017 Jul. 2016 – Aug. 2016
TEACHING EXPERIENCE	Teaching Fellow (Teaching Assistant), Dept. of Mathematics, Korea University	
	<ul style="list-style-type: none"> Linear Algebra II With LAB (MATH 222) Linear Algebra I With LAB (MATH 221) Linear Algebra II With LAB (MATH 222) 	Fall 2023 Spring 2023 Fall 2022
	Research Assistant, Dept. of Mathematics, Korea University	
AWARDS & HONORS	Scholarships, Korea University	
	<ul style="list-style-type: none"> Teaching Fellow Scholarship Teaching Assistant Scholarship Research Scholarship Research Assistant Scholarship Special Scholarships Special Scholarship Veritas Program Scholarship 	Spring 2023, Fall (2022, 2023) Spring 2023, Fall 2023 Fall 2022, Fall 2023 Spring 2022, Fall 2022 Spring (2019, 2020, 2021), Fall (2019, 2020, 2021) Spring (2020, 2021), Fall (2020, 2021) Spring 2016, Fall (2016, 2020)
	Fund Scholarship	
	<ul style="list-style-type: none"> Sigma (Dept. of Mathematics Alumni Association) SAMSUNG Welfare Foundation Scholarship (Dream Class), SAMSUNG 	Fall 2021 Spring 2019
	Honors, Korea University	
	<ul style="list-style-type: none"> Dean's List, College of Science Semester High Honors 	Fall 2020 Spring (2016, 2019, 2020, 2021), Fall (2019, 2020, 2021)

Challenge Awards

- IJCAI 2023 Competition and Challenge Award Aug. 2023
 - * Ranked in the 3rd place of Track 1.2 (Audio Fake Game - Detection, FG-D) from the Second Audio Deepfake Detection Challenge ([ADD 2023](#))
- ICASSP 2022 Grand Challenge Award Mar. 2022
 - * Ranked in the 3rd place of Track 1 (Low-quality Fake Audio Detection, LF) from the 1st Audio Deep Synthesis Detection Challenge ([ADD 2022](#))

Awards

- Poster Encouragement Award, [The Korea Statistical Society](#) Nov. 2021
 - * Poster Title: Light-weight model for voice spoofing detection using BC-ResNet

SEMINARS

Deep Learning Seminar Season 1 & 2 (Leader)

- <https://github.com/smfelixchoi/MATH-DL-study-2> Jun. 2023 – Aug. 2023
- <https://github.com/smfelixchoi/MATH-DL-study> Sep. 2022 – Feb. 2023
- Theoretical Review and Python Implementation of SGD, MLP, CNN, RNN, AE, VAE, GAN.

Deep Reinforcement Learning Seminar (Leader)

Mar. 2023 – Sep. 2023

- <https://github.com/smfelixchoi/MATH-DRL-study>
- Theoretical Review and Python Implementation of MDP, DP, RL, DQN, PG, AC, PPO.

WRITING SAMPLES

Summary Writing

- Deep Reinforcement Learning (<https://github.com/smfelixchoi/All-about-DRL>, in progress)
- Deep Learning (<https://github.com/smfelixchoi/All-about-DL>, in progress)

COMPETENCES

Languages Korean (native), English (proficient)

Techniques \LaTeX , Python, Deep Learning frameworks ([TensorFlow](#), [PyTorch](#)), R

EXTRA- CURRICULAR

SAMSUNG Dream Class

Spring 2019

- Teaching Mathematics to middle school students as an after-school program.

REFERENCES

- Dr. Seungsang Oh seungsang@korea.ac.kr
Professor, Department of Mathematics, Korea University
<https://sites.google.com/view/seungsangoh>
- Dr. Il-Youp Kwak ikwak2@cau.ac.kr
Associate Professor, Department of Applied Statistics, Chung-Ang University
<https://ikwak2.github.io>
- Dr. Donghun Lee holy@korea.ac.kr
Assistant Professor, Department of Mathematics, Korea University
<https://dhl.korea.ac.kr>