CURRICULUM VITAE

Il-Youp Kwak

Work

Department of Applied Statistics
College of Business & Economics
Chung-Ang University
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EDUCATION

2014	PhD, Statistics, University of Wisconsin-Madison (Advisor: Karl W. Broman)
2008	MS, Statistics, Korea University, Seoul, Korea (Advisor: Myung-Hoe Huh)
2006	BS, Mathematics, Korea University, Seoul, Korea

PROFESSIONAL POSITIONS

2023-	Associate Professor, Department of Applied Statistics, College of Business & Economics, Chung-Ang University, Seoul, Korea
2019-2023	Assistant Professor, Department of Applied Statistics, College of Business & Economics, Chung-Ang University, Seoul, Korea
2017-2019	Staff Engineer, Samsung Research, Seoul R&D Campus, Seoul, Korea
2016-2017	Research Associate, Lillehei Heart Institute, University of Minnesota, US (Supervisor: Daniel Garry)
2014-2016	Postdoctoral Associate, Division of Biostatistics School of Public Health, University of Minnesota, US (Supervisor: Wei Pan)

RESEARCH INTERESTS

- Deep learning applications (focus on voice data and biological data)
- Biostatistics: statistical methodology and software development for bio-data analysis
- Real-world big data analysis: Develop new service that combines enterprise big data
- Development of Statistical Software tools

DATA COMPETITIONS

2023.5	[**3rd, IJCAI 2023 challenge track**] Our CAU_KU team (So-Yul Han, Taein Kang, Sunmook Choi, Jaejin Seo, Sanghyeok Chung, Sumi Lee, Seungsang Oh, Il-Youp Kwak) ranked 3rd place at the second Audio Deepfake Detection challenge 2023, Track 1.2 (fake audio detection track).
2022.9	[3rd] Our Unlock_DNA team (Wuming Gong, Byeong-Chan Kim, Juhyun Lee, and Il-Youp Kwak) ranked 3rd place at the DREAM challenge "Predicting gene expression using millions of random promoter sequences." **Challenge paper published in *Nature Biotechnology*.**
2022.9	[3rd and 5th] Our CAU_UMN team (Jungguk Lee, Taein Kang, Narin Kim, Soyul Han, Hyejin Won, Wuming Gong, and Il-Youp Kwak) ranked 3rd place on Heart Murmur

Detection, and 5th place on clinical outcome prediction from Phonocardiogram Recordings at the George B. Moody PhysioNet Challenges.

2022.1   [3rd, **ICASSP 2022 challenge track**] Our CAU_KU team (Il-Youp Kwak, Jonghoon Yang, Yerin Lee, Sunmook Choi and SeungSang Oh) ranked 3rd place at the ICASSP 2022 Grand Challenge on Audio Deepfake Detection Track 1 (Low quality fake audio detection).

2021.7   [6th] Our CAU team (Hyejin Won, Baekseung Kim, Il-Youp Kwak and Changwon Lim) ranked 6th place at the IEEE AASP challenge on Detection and Classification of Acoustic Scenes and Event (DCASE) Task 6 on Audio Captioning.

2020.7   [7th and 9th] Our CAU-ET team (Yerin Lee, Soyoung Lim and Il-Youp Kwak) ranked 7th and 9th place at the IEEE AASP challenge on Detection and Classification of Acoustic Scenes and Event (DCASE) Task 1 subtask B and A

2020.3   [**Winner** of a Biomedical Data Competition] Our team (Il-Youp Kwak and Wuming Gong) won both Subchallenges 2 and 3 of the Allen Institute Cell Lineage Reconstruction DREAM Challenge. ." **Challenge paper published in *Cell Systems*.**

COURSES TAUGHT

Deep Learning for AI   2021 Spring, 2022 Spring, 2023 Spring, 2024 Spring, 2025 Spring
Machine Learning for AI   2021 Fall, 2022 Fall, 2023 Fall, 2024 Fall
Deep Learning with Python   2021 Spring, 2022 Spring, 2023 Spring, 2024 Spring
Mathematical Statistics II   2020 Fall
Mathematical Statistics I   2020 Spring
Biostatistics   2019 Fall

PUBLICATIONS

International

2025   Kim BC, Kim HM, Kang MJ, Nam HJ, Park SH, Lee JW, **Kwak IY*** (2025) OD-SHIELD: Convolutional Autoencoder-based Defense against Adversarial Patch Attacks in Object Detection, *IEEE Access*, 13, pp. 98242-98252.

Nam HJ, **Kang** MJ, Park SH, **Kwak IY***, Lee J (2025) A Benchmark of Unlearnable Examples for Medical Images, *PPAI-25: The 6th AAAI Workshop on Privacy-Preserving Artificial Intelligence*, Philadelphia, PA, USA.

Han S, Seo J, Choi S, Kang T, Chung S, Lee S, Park S, Oh S, **Kwak IY***, (2025) Bell-shaped Frequency Feature Masking Augmentation for Voice Spoofing Detection, *Engineering Science and Technology, an International Journal*, 63, 101972.

Rafi AM, Nogina D, Penzar D, Lee D, Lee D, Kim N, Kim S, Kim D, Shin Y, **Kwak IY**, Meshcheryakov G, Lando A, Zinkevich A, Kim B, Lee J, Kang T, Vaishnav ED, Yadollahpour P, Kim S, Albrecht J, Regev A, Gong W, Kulakovskiy I, Mayer P, (2025) A community effort to optimize sequence-based deep learning models of gene regulation, *Nature Biotechnology*, 43(8):1373-1383.

Si Y, Li Y, Tan J, He Q, **Kwak IY** (2025) Fully Few-shot Class-incremental Audio Classification Using Multi-level Embedding Extractor and Ridge Regression Classifier, Interspeech 2025, Rotterdam, Netherlands.

Namgung M, **Kwak IY**, Kim C (2025) Factors associated with post-traumatic stress symptoms in healthcare providers after performance of cardiopulmonary resuscitation: a mixed-methods study, *Scientific Reports*, 15, 3362.

Choi HW, **Kwak IY**, Oh CR, Goo JM, Yoon SH (2025) Prevalence of Airflow Limitation and Emphysema in Lung Cancer Screening Populations: A Systematic Review and Meta-analysis, CHEST, **168**(1):67-82.

2024 Choi S, Chung S, Lee S, Han S, Kang T, Seo J, **Kwak IY**, Oh S (2024) TB-ResNet: Bridging the Gap from TDNN to ResNet in Automatic Speaker Verification with Temporal-Bottleneck Enhancement, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2024)*, COEX, Seoul, Korea.

Kwak IY*, Kim KS, Min HJ (2024) Association of gustatory dysfunction and Alzheimer's disease: a systematic review and meta-analysis, *Rhinology*, 62(2), 130-142.

Kwak IY*, Kim B, Lee J, Kang T, Garry JD, Zhang J, Gong W (2024) Proformer: a hybrid macaron transformer model predicts expression values from promoter sequences, *BMC Bioinformatics*, 25, 81.

Han S, Kang T, Lee J, Kim N, Won H, Kim YH, Gong W, **Kwak IY***, (2024) A Deep Neural Network Approach to Heart Murmur Detection Using Spectrogram and Peak Interval Features, *Engineering Applications of Artificial Intelligence*, 137, 109156.

Kim H, Kim B, Lee S, Kang M, Nam H, Park S, **Kwak IY**, Lee J (2024) RAPID: Robust multi-pAtch masker using channel-wise Pooled varIance with two-stage patch Detection, *Journal of King Saud University - Computer and Information Sciences*, 192188.

Choi J, **Kwak IY**, Kim K, Min H (2024) Level of Contamination of Positive Airway Pressure Devices Used in Obstructive Sleep Apnea, *Clin Exp Otorhinolaryngol*, 17(2), 160-167.

Kim K, **Kwak IY**, Min H (2024) Factors associated with impaired psychophysical gustatory function, *Clin Otolaryngol*, 49(3), 306-313.

2023 Lee Y, Kim N, Jeong J, **Kwak IY*** (2023) Experimental Case Study of Self-supervised Learning for Voice Spoofing Detection, *IEEE Access*, 11, 24216-24226

Park YB, Kim H, Lee HJ, Baek SH, **Kwak IY**, Kim SH (2023) The Clinical Application of Machine Learning Models for Risk Analysis of Ramp Lesions in Anterior Cruciate Ligament Injuries, *The American Journal of Sports Medicine*, 51(1), 107-118

Kwak IY*, Kim KS, Min HJ (2023) Gustatory dysfunction is related to Parkinson's disease: A systematic review and meta-analysis, *International Forum of Allergy & Rhinology*, 13(10), 1949-1957.

Kwak IY*, Kwag S, Lee J, Jeon Y, Hwang J, Choi HJ, Yang JH, Han SY, Huh JH, Lee CH, Yoon JW(2023) Voice Spoofing Detection through Residual Network, Max Feature Map, and Depthwise Separable Convolution, *IEEE Access*, 11, 49140-49152

Namgung M, Ahn C, Park Y, **Kwak IY**, J Lee, M Won (2023) Mortality of adult patients due to sepsis and septic shock in South Korea: a systematic review and meta-analysis, *Clinical and Experimental Emergency Medicine*, 10(2), 157-171.

Won H, Kim B, **Kwak IY***, Lim C (2023) Using various pre-trained models for audio feature extraction in automated audio captioning, *Expert Systems with Applications*, 231(30), 120664.

Han SY, Kang T, Choi S, Seo J, Chung S, Lee S, Oh S, **Kwak IY*** (2023) CAU KU deep fake detection system for ADD 2023 challenge, *The 32nd International Joint Conference on Artificial Intelligence (IJCAI 2023, Workshop on Deepfake Audio Detection and Analysis)*, Macao SAR, China.

Han SY, Jeon W, Gong W, **Kwak IY*** (2023) MCHeart: Multi-Channel based Heart Signal Processing Scheme for Heart Noise Detection using Deep Learning, *Biology*, 12(10), 1291.

2022 Gong W, Kim H, Garry D, **Kwak IY*** (2022) Single cell lineage reconstruction using distance-based algorithms and the R package, DCLEAR, *BMC Bioinformatics*, 23(1), 1-14

Yang J, Choi S, Lee Y, Oh S, **Kwak IY*** (2022) Light-Weight Frequency Information Aware Neural Network Architecture for Voice Spoofing Detection, *26th International Conference on Pattern Recognition (ICPR 2022)*, Montréal Québec, Canada.

Choi S, **Kwak IY**, Oh S (2022) Overlapped Frequency-Distributed Network: Frequency-Aware Voice Spoofing Countermeasure, *Interspeech 2022*, Incheon, Korea.

Kwak IY*, Choi S, Yang J, Lee Y, Oh S (2022) Low-quality Fake Audio Detection through Frequency Feature Masking, *30th ACM International Conference on Multimedia (ACM MM 2022, Workshop on Deepfake Detection for Audio Multimedia),* Lisbon, Portugal.

Lee J, Kang T, Kim N, Han S, Won H, Gong W, **Kwak IY*** (2022) Deep Learning Based Heart Murmur Detection using Frequency-time Domain Features of Heartbeat Sounds, *The 49th computing in cardiology conference (CinC 2022)* , Tampere, Finland.

Yoshihara T, Miller ND, Rabanal FA, Myles H, **Kwak IY**, Karl WB, Sadkhin B, Dilkes BP, Hudson ME, Spalding EP (2022) Leveraging orthology within maize and Arabidopsis QTL to identify genes affecting natural variation in gravitropism, *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 119 (40) e2212199119.

Choi H, Jung C, Kang T, Kim H, **Kwak IY*** (2022) Explainable Time-series Prediction using a Residual Network and Gradient-based Methods, *IEEE ACCESS*, 10, 108469 - 108482.

Kwak IY*, Kim KS, Min HJ (2022) Differential effect of meteorological factors and particulate matter with $\leq$ 10-μm diameter on epistaxis in younger and older children, *Scientific Reports*, 12, 21029.

2021 **Kwak IY***, Kwag S, Lee J, Huh J, Jeon Y, Hwang J, Yoon J, Lee C. (2021) RESMAX: Detecting Voice Spoofing Attacks with Residual Network and Max Filter Map, *25th International Conference on Pattern Recognition (ICPR2020)*, Milan, Italy

Lee Y, Lim S, **Kwak IY*** (2021) CNN-Based Acoustic Scene Classification System, Electronics, 10(4), 371

Kim K, **Kwak IY**, Min H (2021) Particulate Matter 10 (PM10) Is Associated with Epistaxis in Children and Adults, *International Journal of Environmental Research and Public Health*, 18(9), 4809,

Gong W, Granados A, Hu J, Jones M, Raz O, Martinez IS, Zhang H, Chow KK, **Kwak IY**, … , Meyer P. (2021) Benchmarked approaches for cell lineage reconstructions of in vitro dividing cells and in silico models of Caenorhabditis elegans and Mus musculus developmental trees, *Cell Systems*, 12, 1-17.

Park J, **Kwak IY**, Lim C (2021) A Deep Learning Model with Self-Supervised Learning and Attention Mechanism for COVID-19 Diagnosis Using Chest X-ray Images, *Electronics*, 10(16), 1996.

Won H, Kim BS, **Kwak IY** and Lim C (2021) Transformer Followed by Transfer Learning for Audio Captioning, *The 6th Workshop on Detection and Classification of Acoustic Scenes and Events (DCASE2021),* Online.

2020 Ahmed E, **Kwak IY**, Huh J, Kim I, Oh T, Kim H (2020) Void: A fast and light voice liveness detection system, *USENIX Security Symposium*, Boston, USA.

Yoon HY, **Kwak IY*** (2020) Association Modeling on Keyword and Abstract Data in Korean Port Research, *Journal of Korea Trade*, 25 (5), 71-86

2019 **Kwak IY***, Huh J, Kim I, Han S, Yoon J. (2019) Voice Presentation Attack Detection through Text-Converted Voice Command Analysis, *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems,* Glasgow, UK.

Magli A, Baik J, Mills LJ, **Kwak IY**, Dillon BS, Gonzalez RM, Stafford DA, Swanson SA, Stewart R, Thomson JA, Garry DJ, Dynlacht BD, Perlingeiro R (2019) Time-dependent Pax3-mediated chromatin remodeling and cooperation with Six4 and Tead2 specify the skeletal myogenic lineage in developing mesoderm, *PLoS biology*, 17 (2), e3000153

Magli A, Baik J, Pota P, Cordero CO, **Kwak IY**, Garry DJ, Love PE, Dynlacht BD, Perlingeiro R (2019) Pax3 cooperates with Ldb1 to direct local chromosome architecture during myogenic lineage specification, *Nature Communications,* 10, 2316

2018 Gong W, **Kwak IY***, Pota P, Koyano-Nakagawa N, Garry DJ. (2018) DrImpute: imputing dropout events in single cell RNA sequencing data, *BMC Bioinformatics*, 19 (1), 220

Gong W, **Kwak IY,** Koyano-Nakagawa N, Pan W, Garry DJ. (2018) TCM visualizes trajectories and cell populations from single cell data, *Nature Communications*, 9 (1), 2749

2017 **Kwak IY*,** Pan W. (2017) Gene- and pathway-based association tests for multiple traits with GWAS summary statistics. *Bioinformatics*, 33 (1), 64-71.

Chen Z, Zhu W, Bender I, Gong W, **Kwak IY**, Yellamilli A, Hodges TJ, Nemoto N, Zhang J, Garry DJ, Berlo JH (2017) Pathologic Stimulus Determines Lineage Commitment of Cardiac C-kit+ Cells. *Circulation*, circulationaha. 117.030137

2016   Wei P, Cao Y, Zhang Y, **Kwak IY**, Xu Z, Crosby J, Boerwinkle E, Pan W. (2016) On Robust Association Testing for Quantitative Traits and Rare Variants. *G3*, 116.035485.

       Kwak IY*, Pan W. (2016) Adaptive Gene- and Pathway-Trait Association Testing with GWAS Summary Statistics. *Bioinformatics*, 32 (8), 1178-1184.

2015   Pan W, **Kwak IY**, Wei P. (2015) A Powerful Pathway-Based Adaptive Test for Genetic Association with Common or Rare Variants. *The American Journal of Human Genetics*, 97:86-98

       Kwak IY*, Moore CR, Spalding EP, Broman KW. (2015) Mapping quantitative trait loci underlying function-valued traits using functional principal component analysis and multi-trait mapping. *G3*, 6 (1), 79-86.

2014   **Kwak IY*,** Moore CR, Spalding EP and Broman KW. (2014) A simple regression-based method to map quantitative trait loci underlying function-valued phenotypes. *Genetics*, 197(4):1409-1416

2013   Moore CR, Johnson LS, **Kwak IY**, Livny M, Broman KW, Spalding EP (2013) High-throughput computer vision introduces the time axis to a quantitative trait map of a plant growth response. *Genetics* 195:1077–1086

2010   Billings T, Sargent EE, Szatkiewicz JP, Leahy N, **Kwak, IY**, Bektassova N, Walker M, Hassold T, Graber JH, Broman KW, Petkov PM (2010) Patterns of recombination activity on mouse chromosome 11 revealed by high resolution mapping. *PLoS One* 5:e15340

Domestic

2024   Seo J, Kang T, **Kwak IY*** (2024) Pre-trained models and ensemble technique for speech emotion recognition, *Journal of the Korean Data and Information Science Society*, 35(4), 445-459

2023   Park K, **Kwak IY*** (2023) Comparative study of data augmentation methods for fake audio detection, *The Korean Journal of Applied Statistics*, 36(2), 101-114

       Kang T, **Kwak IY*** (2023) A two-stage training approach for voice spoofing detection, *Journal of the Korean Data and Information Science Society*, 34, 203-214

2021   Yang JH, **Kwak IY*** (2021) Research trends in statistics for domestic and international journal using paper abstract data, The Korean Journal of Applied Statistics, 34(2), 267—278

       Choi HJ, **Kwak IY*** (2021) Data augmentation in voice spoofing problem, The Korean Journal of Applied Statistics, 34(3), 435—446

       Yoon HY, **Kwak IY*** (2021) Analysis of Shipping and Logistics News Articles using Topic Modeling, Korea Trade Revie, 46(4), 61—76

       Lim SY, **Kwak IY*** (2021) Light weight architecture for acoustic scene classification, The Korean Journal of Applied Statistics, 34(6), 979—993

2020   Yoon HY, **Kwak IY*** (2020) Trends in FTA Research of Domestic and International Journal using Paper Abstract Data, Korea Trade Revie, 45(5), 37—53

       Yoon HY, **Kwak IY*** (2020) The Association Modeling on Keywords and Documents of Korea International Trade Research using Paper Abstract data, Korea International Commerce Review, 35(2), 45—64

2019   Yoon HY, **Kwak IY*** (2019) The Association Modeling on Keywords and Documents of Logistics Research using Paper Abstract data, Korea International Commerce Review, 34(3), 147—166

2008   **Kwak IY***, Huh MH (2008) Andrews' Plot for Extended Uses, *The Korean Communications in Statistics*, 15: 87–94

       Kwak IY*, Huh MH (2008) Parallel Coordinate Plots of Mixed-Type Data, *The Korean Communications in Statistics*, 15: 587–595

       Park MR, **Kwak IY**, Huh MH (2008) Applications of Parallel Coordinate Plots for Visualizing Gene Expression Data, *The Korean Journal of Applied Statistics*, 21(6): 911–921

SOFTWARE DEVELOPMENT

Python/PrixFixe A Python module prepared for Random Promoter Dream Challenge 2022. Sequence-to-expression models trained on expression measurements of random promoter sequences. The models would receive regulatory DNA sequence as input and use it to predict the corresponding gene expression value. The top-performing solutions in the challenge exceeded performance of all previous state-of-the-art models for similar data.

R/DCLEAR An R package for R package for Distance based Cell LinEAge Reconstruction (DCLEAR). These codes are created during the participation of Cell Lineage Reconstruction DREAM challenge. Our team achieved the best performance on subchallenges 2 and 3 of the competition.

R/Drimpute An R package for imputing dropout events. Many statistical methods in cell type identification, visualization and lineage reconstruction do not account for dropout events ('PCAreduce', 'SC3', 'PCA', 't-SNE', 'Monocle', 'TSCAN', etc). 'DrImpute' can improve the performance of such software by imputing dropout events.

R/aSPU An R package for the (adaptive) Sum of Powered Score ('SPU' and 'aSPU') tests, inverse variance weighted Sum of Powered score ('SPUw' and 'aSPUw') tests and some gene-based and pathway based association tests (aSPUs, aSPUsPath, MTaSPUsSet, MTaSPUsSetPath, etc). (https://cran.r-project.org/web/packages/aSPU/index.html).

R/funqtl An R package with add-on functions for the R/qtl package to deal with QTL mapping for function-valued traits. (github.com/ikwak2/funqtl).

R/xoi Tools for analyzing crossover interference. (github.com/kbroman/xoi). Assisted Karl Broman to develop the package using C language.

R/APCP An R package that plots Andrews type parallel coordinate plot. (github.com/ikwak2/APCP).

PRESENTATIONS

2022 Low-quality Fake Audio Detection through Frequency Feature Masking, 30th ACM International Conference on Multimedia (ACM MM 2022, Workshop on Deepfake Detection for Audio Multimedia), Lisbon, Portugal

2021 Detecting voice spoofing attacks with residual network and max filter map with Grad-CAM activation, 4th International Conference on Econometrics and Statistics (EcoSta 2021), HKUST, Hong Kong

2021 ResMax: Detecting Voice Spoofing Attacks with Residual Network and Max Filter Map, 10th World Congress in Probability and Statistics, Seoul, Korea

2020 ResMax: Detecting Voice Spoofing Attacks with Residual Network and Max Filter Map, *Spring Conference, The Korean Statistical Society*, Cheonan, Korea

2019 A survey on voice spoofing detection methods, *Autumn Conference, The Korean Statistical Society*, Seoul, Korea

2019 Voice Presentation Attack Detection through Text-Converted Voice Command Analysis, *Spring Conference, The Korean Statistical Society*, Kangwon, Korea

2019 Voice Presentation Attack Detection through Text-Converted Voice Command Analysis, *2019 CHI Conference on Human Factors in Computing Systems*, Glasgow, UK

2017 Gene- and pathway-based association tests for multiple traits with GWAS summary statistics, *2017 ENAR spring meeting*, Washington, DC

2016   Adaptive Gene- and Pathway-Trait Association Testing with GWAS Summary Statistics, *2016 ENAR spring meeting*, Austin, TX

2015   Regression-Based Methods to Map Quantitative Trait Loci Underlying Function-Valued Phenotypes, *2015 ENAR spring meeting*, Miami, FL

2015   Adaptive Gene- and Pathway-Trait Association Testing with GWAS Summary Statistics, *2015 3rd Annual BICB Symposium*, Minneapolis, MN

2013   QTL analysis with Function-valued Trait Data, *2013 ENAR Spring meeting*, Olando, FL

2008   Parallel Coordinate Plots of Mixed-type Data, *2008 Korea-Japan Student Conference*, Seoul, Korea

2007   Andrews' Plot for Extended Uses, *Autumn Conference, The Korean Statistical Society*, Seoul, Korea

POSTERS

2021   RESMAX: Detecting Voice Spoofing Attacks with Residual Network and Max Filter Map, 25th International Conference on Pattern Recognition (ICPR2020), Milan, Italy

2021   DCLEAR: Reconstructing Single Cell Lineage Trees from CRSIPR recorders by Distance-based Methods, Keystone symposia on Molecular and Cellular Biology, Single Cell Biology (EK26), Virtual conference.

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2016   Gene-based association tests for multiple traits with GWAS summary statistics, TC ASA Fall Research Meeting, Mounds View, MN

2015   Adaptive Gene- and Pathway-Trait Association Testing with GWAS Summary Statistics, TC ASA Fall Research Meeting, Rochester, MN

2013   QTL analysis with Function-valued Trait Data, Complex Trait Community annual meeting, Madison, WI

OTHER SERVICES

2025-   **Associate Editor** for *Journal of Statistical Computation and Simulation (SCIE, IF:1.2, Q3)*

International Conference Reviewer

IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2025), Interspeech 2025

Journal Reviewer

Molecular Ecology Resources, Scientific Reports, Biometrics, IEEE-ACM Transactions on audio speech and language processing, IEEE/ACM Transactions on Computational Biology and Bioinformatics, Bioinformatics, Engineering Applications of Artificial Intelligence, Journal of Korean Statistical Society, Communications for Statistical Applications and Methods, iScience, IEEE Transactions on Mobile Computing, International Journal of Environmental Research and Public Health, Healthcare, Frontiers in Genetics, Journal of king saud university - computer and information sciences, Journal of Digital Imaging, Frontiers in Plant Science,

RESEARCH GRANTS

2020 – 2023 한국연구재단 우수신진연구과제, Deep Learning Applications in Voice Security, PI
2023 – 2026 한국연구재단 중견연구 / 신진후속 과제, Voice Spoofing Detection using Deep Learning, PI