

Sang-gil Lee

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EDUCATION

Seoul National University, Seoul, Korea

- B.S. (dual major) in Electrical & Computer Engineering, Applied Biology & Chemistry Mar 2010 – Aug 2016
 - Focus: Machine learning, Bioinformatics, Molecular biology
 - Cumulative GPA: 3.7 / 4.3 (Cum Laude)
- Ph.D. in Electrical & Computer Engineering Sep 2016 – Feb 2023 (expected)
 - Focus: Deep generative models, probabilistic models, density estimation, sequence learning, speech and audio synthesis, natural language processing
 - Cumulative GPA: 3.79 / 4.3

SCHOLARSHIP

Academic Scholarship (fully-funded), SBS Foundation, 2010 - 2016

Academic Performance Scholarship, Seoul National University, 2010 - 2016

INTERNSHIP

- **Microsoft Research Asia**, Machine Learning Group (manager: Bin Shao) Dec 2018 – Feb 2019
- **Kakao Corporation**, AI Laboratory (manager: Jaekyoung Bae) Jul 2019 – Sep 2019
- **Microsoft Research Asia**, Machine Learning Group (manager: Xu Tan, Tao Qin) Dec 2020 – Jun 2021
- **NVIDIA**, AI Application Team (manager: Wei Ping, Boris Ginsburg) Sep 2021 – Jan 2022

PUBLICATIONS

CONFERENCES

- [1] S. Lee, W. Ping, S. Yoon, B. Ginsburg, and B. Catanzaro, “BigVGAN: A Universal Neural Vocoder with Large-Scale Training,” *Under review*, 2022.
- [2] S. Lee, H. Kim, C. Shin, X. Tan, C. Liu, Q. Meng, T. Qin, W. Chen, S. Yoon, and T. Liu, “PriorGrad: Improving Conditional Denoising Diffusion Models with Data-Dependent Adaptive Prior,” in *ICLR*, Apr 2022.
- [3] S. Lee, S. Kim, and S. Yoon, “NanoFlow: Scalable Normalizing Flows with Sublinear Parameter Complexity,” in *NeurIPS*, Vancouver, Canada, Dec 2020.
- [4] S. Kim, S. Lee, J. Song, J. Kim, and S. Yoon, “FloWaveNet : A Generative Flow for Raw Audio,” in *ICML*, Long Beach, CA, USA, Jun 2019.
- [5] S. Lee, J.S. Bae, H. Kim, J.H. Kim, and S. Yoon, “Liver Lesion Detection from Weakly-labeled Multi-phase CT Volumes with a Grouped Single Shot MultiBox Detector,” in *MICCAI*, Granada, Spain, Sep 2018.
- [6] S. Park, S. Lee, H. Nam, and S. Yoon, “An Efficient Method to Boosting Performance of Spiking Neural Network Training,” in *NIPS Workshop on Computing with Spikes*, Barcelona, Spain, Dec 2016.
- [7] S. Lee and S. Yoon, “Deep Deterministic Policy Gradients as a Proxy for Semi-supervised Deep Learning of Network Intrusion Detection,” in *Korea Computer Congress*, Jeju, Korea, Jun 2017.
- [8] J. Lee, Y. Jeon, B. Na, S. Lee and S. Yoon, “Fine Dust Time Series Anomaly Detection using Transfer Entropy and Network Similarity,” in *Korea Computer Congress*, Jeju, Korea, Jun 2017.

JOURNALS

- [1] S. Lee, E. Kim, J.S. Bae, J.H. Kim, and S. Yoon, “Robust End-to-End Focal Liver Lesion Detection using Unregistered Multiphase Computed Tomography Images,” *IEEE Transactions on Emerging Topics in Computational Intelligence (IEEE TETCI) (Impact Factor: 8.28)*, Dec 2021.
- [2] T. Kim, J.H. Park, S. Lee, S. Kim, J. Kim, J. Lee, and C. Shin, “Small RNA Transcriptome of Hibiscus Syriacus Provides Insights into the Potential Influence of microRNAs in Flower Development and Terpene Synthesis,” *Molecules and Cells (Impact Factor: 5.03)*, vol. 40, no. 8, pp. 587, Aug 2017.

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- [1] D. Lee, J. Yoon, J. Song, S. Lee, and S. Yoon, “One-Shot Learning for Text-to-SQL Generation,” in *arXiv preprint:1905.11499*, Apr 2019.
- [2] S. Lee, U. Hwang, S. Min, and S. Yoon, “Polyphonic Music Generation with Sequence Generative Adversarial Networks,” in *arXiv preprint:1710.11418*, Oct 2017.

REPOSITORIES	FloWaveNet ★400+
	A Pytorch implementation of “FloWaveNet: A Generative Flow for Raw Audio”.
	relational-rnn-pytorch ★200+
	An implementation of DeepMind’s Relational Recurrent Neural Networks (Santoro et al. 2018) in PyTorch.
	WaveFlow ★100+
	A PyTorch implementation of “WaveFlow: A Compact Flow-based Model for Raw Audio”.
OPEN-SOURCE CONTRIBUTION	NanoFlow ★50+
	PyTorch implementation of the paper “NanoFlow: Scalable Normalizing Flows with Sublinear Parameter Complexity.”
	grouped-ssd-pytorch
	PyTorch implementation of MICCAI 2018 paper “Liver Lesion Detection from Weakly-labeled Multi-phase CT Volumes with a Grouped Single Shot MultiBox Detector”.
	seqgan-music
	Implementation of a paper ”Polyphonic Music Generation with Sequence Generative Adversarial Networks” in TensorFlow.
RESEARCH EXPERIENCE	NVIDIA NeMo ★4000+
	Contributed to an open-source implementation of UnivNet vocoder (Jang et al., 2021).
	NVIDIA BigVGAN ★100+
	Contains an open-source implementation of my work, BigVGAN (Lee et al.,2022).
	Microsoft NeuralSpeech ★500+
	Contains an open-source implementation of my work, PriorGrad (Lee et al., ICLR 2022).
Seoul National University, Seoul, Korea	
	<ul style="list-style-type: none"> ▪ Undergraduate Research Student, Applied Biology & Chemistry Mar 2015 – Aug 2016 <ul style="list-style-type: none"> • Project: in-silico miRNA analysis of Hibiscus Syriacus • Supervisor: Prof. Chanseok Shin • Developed a rule-based miRNA discovery algorithm from whole genome sequence and RNA-seq data only (https://github.com/L0SG/miRNA_Project), which is suitable for analysis of miRNA of novel species. Participated as a co-author of the journal article. The excavated novel miRNA granted a KR patent (KR101669246B1). ▪ Undergraduate Research Student, Electrical & Computer Engineering Mar 2016 – Aug 2016 <ul style="list-style-type: none"> • Project: Pedestrian detection with convolutional neural networks • Supervisor: Prof. Wonyong Sung • Implemented a CNNs-based pedestrian detection model with sliding-window approach ▪ Graduate Research Student, Electrical & Computer Engineering Aug 2016 – Aug 2017 <ul style="list-style-type: none"> • Project: Imaging Genetics using deep learning for detecting Alzheimer’s disease risk gene • Supervisor: Prof. Sungroh Yoon • Developed a 3DCNN-based Alzheimer’s disease classification model using ADNI, a multi-modal imaging genetics dataset, with a novel elastic distortion techniques for data augmentation. ▪ Graduate Research Student, Electrical & Computer Engineering Aug 2016 – Jun 2017 <ul style="list-style-type: none"> • Project: Application Technology for Neuromorphic Devices and Systems • Supervisor: Prof. Sungroh Yoon • Provided a deep learning application for a novel neuromorphic hardware using spiking neural networks (SNNs). Research on SNNs publised in NIPS workshop 2016. ▪ Graduate Research Student, Electrical & Computer Engineering Apr 2017 – Apr 2019 <ul style="list-style-type: none"> • Project: Development of machine learning-based liver disease imaging diagnosis support system • Supervisor: Prof. Sungroh Yoon • Developed a novel variant of Single Shot MultiBox Detector (SSD), a renowned deep-learning based object detection model, for an accurate diagnosis of liver diseases. Results published in International Conference on Medical Image Computing & Computer Assisted Intervention (MICCAI) in 2018, and IEEE TETCI (Impact Factor: 8.28) as a journal article in 2021. ▪ Graduate Research Student, Electrical & Computer Engineering Mar 2017 – Dec 2017 <ul style="list-style-type: none"> • Project: AI-powered Network Intrusion Detection Systems • Supervisor: Prof. Sungroh Yoon • Developed an LSTM-based unsupervised clustering algorithm using firewall log data for network anomaly detection of sequential streaming data. ▪ Graduate Research Student, Electrical & Computer Engineering Oct 2017 – Jun 2019 <ul style="list-style-type: none"> • Project: FIM Core Technology and System Development for Data-intensive Applications • Supervisor: Prof. Sungroh Yoon

- Provided deep learning-based speech synthesis benchmarks and optimized applications for a novel processing-in-memory hardware for analyzing performance characteristics.

**RESEARCH
INTERESTS**

Deep generative models, probabilistic models, density estimation, sequence learning, speech and audio synthesis, natural language processing

LANGUAGES

- Korean: Native language.
- English: Fluent (speaking, reading, writing).

REFERENCES

- **Professor Sungroh Yoon**
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