Sanghyun Son

Contact Information

Affiliation:	Samsung Electronics
Address:	130 Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16678, Korea
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Github:	https://github.com/sanghyun-son
Homepage:	https://sanghyun-son.github.io
Google scholar:	link

Work Experience

Staff Engineer   Sep. 2023 – Present
Computer Vision TU, AI Research Center, SAIT, Samsung Electronics

(Sep. 2023 – Mar. 2024) AI-based ISP solution, especially on low-light machine vision.

(Apr. 2024 – Present) Multi-modal agent for manufacturing process automation, especially on distributed parallel backend architecture for data processing, model serving and training.

Education

Ph.D. in Department of ECE   Mar. 2017 – Aug. 2023
Integrated Ph.D. program in Seoul National University (SNU), Seoul, Korea
Thesis: Generalized Resampling Model for Practical Image Super-Resolution
Advisor: Kyoung Mu Lee

B.S. in Department of ECE - *summa cum laude*   Mar. 2013 – Feb. 2017
Seoul National University (SNU), Seoul, Korea

International Publications

• Reyhaneh Neshatavar*, Mohsen Yavartanoo*, **Sanghyun Son**, and Kyoung Mu Lee, "ICF-SRSR: Invertible scale-Conditional Function for Self-Supervised Real-world Single Image Super-Resolution," In **WACV**, 2024.

• Joonkyu Park, **Sanghyun Son**, and Kyoung Mu Lee, "Content-Aware Local GAN for Photo-Realistic Super-Resolution," In **ICCV**, 2023.

• Wooseok Lee, **Sanghyun Son**, and Kyoung Mu Lee, "AP-BSN: Self-Supervised Denoising for Real-World Images via Asymmetric PD and Blind-Spot Network," In **CVPR**, 2022.

• Reyhaneh Neshatavar, Mohsen Yavartanoo, **Sanghyun Son**, and Kyoung Mu Lee, "CVF-SID: Cyclic Multi-Variate Function for Self-Supervised Image Denoising by Disentangling Noise from Image," In **CVPR**, 2022.

• Seungjun Nah, **Sanghyun Son**, Jaerin Lee, and Kyoung Mu Lee, "Clean Images are Hard to Reblur: Exploiting the Ill-Posed Inverse Task for Dynamic Scene Deblurring," In **ICLR**, 2022.

• Geonwoon Jang, Wooseok Lee, **Sanghyun Son**, and Kyoung Mu Lee, "C2N: Practical Generative Noise Modeling for Real-World Denoising," In **ICCV**, 2021.

• **Sanghyun Son** and Kyoung Mu Lee, "SRWarp: Generalized Image Super-Resolution under Arbitrary Transformation," In **CVPR**, 2021.

• **Sanghyun Son**, Jaeha Kim, Wei-Sheng Lai, Ming-Hsuan Yang, and Kyoung Mu Lee, "Toward Real-World Super-Resolution via Adaptive Downsampling Models,' IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**), vol. 44, no. 11, pp. 8567-8670, 2022. https://doi.org/10.1109/TPAMI.2021.3106790

• **Sanghyun Son** and Kyoung Mu Lee, "Image Super-Resolution," in Ikeuchi K. (eds) Computer Vision. Springer, Cham, 2021. https://doi.org/10.1007/978-3-030-03243-2_838-1

• Seungjun Nah, **Sanghyun Son**, and Kyoung Mu Lee, "Recurrent Neural Networks with Intra-Frame Iterations for Video Deblurring," In **CVPR**, 2019.

• **Sanghyun Son**, Seungjun Nah, and Kyoung Mu Lee, "Clustering Convolutional Kernels to Compress Deep Neural Networks," In **ECCV**, 2018.

• Bee Lim, **Sanghyun Son**, Heewon Kim, Seungjun Nah, and Kyoung Mu Lee, "Enhanced Deep Residual Networks for Single Image Super-Resolution," **NTIRE 2017** workshop in conjunction with **CVPR**, 2017. (**Challenge winners, Workshop best paper, Over 5,000 citations on Google Scholar, over 2,300 Github stars**)

International Challenges and Reports

• **Sanghyun Son**, Suyoung Lee, Seungjun Nah, Radu Timofte, and Kyoung Mu Lee, "NTIRE 2021 Challenge on Video Super-Resolution," **NTIRE 2021** workshop in conjunction with **CVPR**, 2021.

• Seungjun Nah, **Sanghyun Son**, Suyoung Lee, Radu Timofte, and Kyoung Mu Lee, "NTIRE 2021 Challenge on Image Deblurring," **NTIRE 2021** workshop in conjunction with **CVPR**, 2021.

• **Sanghyun Son**, Jaerin Lee, Seungjun Nah, Radu Timofte, and Kyoung Mu Lee, "AIM 2020 Challenge on Video Temporal Super-Resolution," **AIM 2020** workshop in conjunction with **ICCV**, 2020.

• Seungjun Nah, **Sanghyun Son**, Radu Timofte, and Kyoung Mu Lee, "NTIRE 2020 Challenge on Image and Video Deblurring," **NTIRE 2020** workshop in conjunction with **CVPR**, 2020.

• Seungjun Nah, **Sanghyun Son**, Radu Timofte, and Kyoung Mu Lee, "AIM 2019 Challenge on Video Temporal Super-Resolution: Methods and Results," **AIM 2019** workshop in conjunction with **ICCV**, 2019.

• Seungjun Nah, Sungyong Baik, Seokil Hong, Gyeongsik Moon, **Sanghyun Son**, Radu Timofte, and Kyoung Mu Lee, "NTIRE 2019 Challenge on Video Deblurring and Super-Resolution: Dataset and Study," **NTIRE 2019** workshop in conjunction with **CVPR**, 2019.

Internship

Student Research Intern   Jan. 2019 - Jun. 2019
Research Topic: Real-World Single Image Super-Resolution
Google Cloud, Sunnyvale, CA, USA
Mentor: Ming-Hsuan Yang

Academic Experience & Service

Workshop Challenge Co-organizer

NTIRE 2021 Challenge on Video Super-Resolution, Video Deblurring   Jun. 2021
NTIRE 2021 workshop in conjunction with CVPR, 2021

AIM 2020 Challenge on Video Temporal Super-Resolution   Aug. 2020
AIM 2020 workshop in conjunction with ECCV, 2020

AIM 2019 Challenge on Video Temporal Super-Resolution   Sep. 2019
AIM 2019 workshop in conjunction with ICCV, 2019

Conference Reviewer

CVPR, ECCV, ICCV, and the corresponding Workshops on image restoration

Journal Reviewer

IEEE TPAMI, TIP, TCI
Springer IJCV
Elsevier CVIU

Teaching Assistant

EE729.003: Advanced Trends in Computer Vision (ATCV)   Sep. 2020 – Dec. 2020
Seoul National University, Seoul, Korea

Neural Processing Expert (NPEX): Image Restoration Lab.   Sep. 2020
Samsung Electronics SNU R&D Center, Seoul, Korea

EE729.001: Topics in Control and Automation   Sep. 2019 – Dec. 2019
Seoul National University, Seoul, Korea

Neural Processing Expert (NPEX): Image Restoration Lab.   Jul. 2019
Samsung Electronics SNU R&D Center, Seoul, Korea

EE306: Signal and Systems   Mar. 2017 – Jun. 2017
Seoul National University, Seoul, Korea

Research Projects

MLPerf Mobile AI Benchmark: Super-Resolution Track   Apr. 2022 – Mar. 2023
in conjunction with MLCommons
   Invited talk: Mobile Super-Resolution on MLPerf App - Benchmarking and Challenges
   Efficient Deep Learning Workshop for Conputer Vision, in conjunction with **CVPR**, 2023.

Pixel-wise Adaptive Weighting for Perceptual Image Super-Resolution   May 2022 – May 2023
   with Naver

Efficient Vision Transformer for Image Super-Resolution   May 2021 – May 2022
   with Naver

Raw Food Image Generation by Domain Adaptation   Dec. 2020 – Dec. 2021
   with Samsung Research

Awards and Honors

- **The KCCV Sang-Uk Lee Prize** (Test of Time award) from KCCV 2022.
- Winner of **Qualcomm Innovation Fellowship Korea** 2021.
- **Highly Cited Paper Award** from Department of ECE, SNU, 2018.
- **1st Place Award** in NTIRE 2017 Challenge on Single Image Super-Resolution.
- **Best Paper Award** of NTIRE 2017 Workshop: Challenge Track.

Scholarships

- **Youlchon AI Stars Scholarship**, Youlchon Foundation $\qquad$ 2022
- **Kwanjeong Scholarship**, Kwanjeong Educational Foundation $\qquad$ 2017 – 2018
- **National Scholarship for Science & Engineering**, Korea Student Aid Foundation $\quad$ 2015 – 2016
- **Scholarship of Academic Excellence**, Seoul National University $\qquad$ 2013 – 2014

Skills

- **Programming languages**: Python, C++, CUDA, MATLAB, Bash
- **Software stacks**: PyTorch (DDP, FSDP), TensorFlow, vLLM, DeepSpeed, FastAPI
- **Others**: LaTeX, Korean (Native), English (Intermediate)

Research Interests

Throughout my Ph.D. program, I have primarily worked on low-level image restoration problems, including image super-resolution, denoising, and deblurring. Since one of my core missions is to create real-world value through technology, I focused on addressing more practical image restoration problems in the later stages of my Ph.D. program. Currently, I am also interested in utilizing large-scale models to automate industry processes and workflows to improve our daily lives.

References

Advisor	Kyoung Mu Lee
	Professor
	Seoul National University
	kyoungmu(at)snu.ac.kr
	https://cv.snu.ac.kr/index.php/kmlee
Mentor	Ming-Hsuan Yang
	Professor
	UC Merced, Google
	mhyang(at)ucmerced.edu
	http://faculty.ucmerced.edu/mhyang