

Dr. Jaehong Yoon

CONTACT INFORMATION

UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL, NC
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LINKS: [HOMEPAGE](#), [GOOGLE SCHOLAR](#), [TWITTER](#)

RESEARCH INTERESTS

My research interest mainly focuses on developing lifelong-evolving and meta-cognitive algorithms for deploying on-device artificial general intelligence systems. In particular, I've been focusing on tackling practical and real-world challenges in various application domains, such as online/streaming learning, egocentric videos, and audio-video multimodal problems. I currently focus on the following topics:

- [Online Continual Learning](#): Lifelong Learning, Video Streaming Learning
- [On-device Learning](#): Federated Learning, Neural Network Compression
- [Egocentric Vision](#): Video Representation Learning, Audio-video Multimodal Learning
- [Learning with Real-world Data](#): Un-/Semi-supervised Learning, Coreset Selection

EDUCATION

[KAIST](#), Daejeon, South Korea

Ph.D., School of Computing,

Aug 2018 - Feb 2023

- Thesis: *"On-device, Online Continual Learning for the Real World"*
- [The Best Ph.D. Dissertation Award](#) from KAIST College of Engineering
- [The Best Ph.D. Dissertation Award](#) from KAIST School of Computing
- [Machine Learning and Artificial Intelligence \(MLAI\) Lab](#)
- Adviser: [Prof. Sung Ju Hwang](#)
- Area of Study: Machine Learning

[UNIST](#), Ulsan, South Korea

M.S., Computer Science,

Aug 2016 - Feb 2018

- Thesis: *"Combined Group and Exclusive Sparsity for Deep Neural Networks"*
- Adviser: [Prof. Sung Ju Hwang](#)
- Area of Study: Machine Learning

B.S., Computer Science Engineering,

Mar 2012 - Aug 2016

- Biological Science Minor

RESEARCH EXPERIENCE

Postdoctoral Research Associate, UNC Chapel Hill, NC
[MURGe-Lab](#)

08/2023 - Current

Adviser: [Prof. Mohit Bansal](#)

Postdoctoral Research Associate, KAIST, South Korea

03/2023 - 08/2023

Adviser: [Prof. Sung Ju Hwang](#)

Visiting Student, Weizmann Institute of Science, Israel

10/2022 - 11/2022

Host: [Prof. Yonina Eldar](#)

Research Intern, Microsoft Research, China

11/2021 - 04/2022

Visual Computing Group

Mentor: [Dr. Yue Cao](#)

Research Scientist, MLAI Lab., KAIST, South Korea

02/2018 - 08/2018

- [C13] *Text-Guided Token Selection for Text-to-Image Synthesis with Token-based Diffusion Models*
Jaewoong Lee*, Sangwon Jang*, Jaehyeong Jo, **Jaehong Yoon**, Yunji Kim, Jin-Hwa Kim, Jung-Woo Ha, Sung Ju Hwang
International Conference on Computer Vision (**ICCV**) **2023**, Paris, France
- [C12] *Continual Learners are Incremental Model Generalizers*
Jaehong Yoon, Sung Ju Hwang, Yue Cao
International Conference on Machine Learning (**ICML**) **2023**, Hawaii, USA
- [C11] *Personalized Subgraph Federated Learning*
Jinheon Baek*, Wonyong Jeong*, Jiongdao Jin, **Jaehong Yoon**, and Sung Ju Hwang
International Conference on Machine Learning (**ICML**) **2023**, Hawaii, USA
- [C10] *On the Soft-Subnetwork for Few-shot Class Incremental Learning*
Haeyong Kang, **Jaehong Yoon**, Sultan Madjid, Sung Ju Hwang, Chang D. Yoo
International Conference on Learning Representations (**ICLR**) **2023**, Kigali, Rwanda
- [C9] *Bitwidth Heterogeneous Federated Learning with Progressive Weight Dequantization*
Jaehong Yoon*, Geon Park*, Wonyong Jeong, and Sung Ju Hwang
International Conference on Machine Learning (**ICML**) **2022**, Baltimore, USA
- [C8] *Forget-free Continual Learning with Winning Subnetworks*
Haeyong Kang*, Rusty Mina*, Sultan Madjid, **Jaehong Yoon**, Mark Hasegawa-Johnson, Sung Ju Hwang, and Chang D. Yoo
International Conference on Machine Learning (**ICML**) **2022**, Baltimore, USA
- [C7] *Rethinking the Representational Continuity: Towards Unsupervised Continual Learning*
Divyam Madaan, **Jaehong Yoon**, Yuanchun Li, Yunxin Liu, and Sung Ju Hwang
International Conference on Learning Representations (**ICLR**) **2022**, Virtual
Oral Presentation (Acceptance Rate = 54/3391 = 1.6%)
- [C6] *Online Coreset Selection for Rehearsal-based Continual Learning*
Jaehong Yoon, Divyam Madaan, Eunho Yang, and Sung Ju Hwang
International Conference on Learning Representations (**ICLR**) **2022**, Virtual
- [C5] *Federated Continual Learning with Weighted Inter-client Transfer*
Jaehong Yoon*, Wonyong Jeong*, Giwoong Lee, Eunho Yang, and Sung Ju Hwang
Lifelong Machine Learning Workshop @ ICML 2020
International Conference on Machine Learning (**ICML**) **2021**, Virtual
- [C4] *Federated Semi-supervised Learning with Inter-Client Consistency & Disjoint Learning*
Wonyong Jeong, **Jaehong Yoon**, Eunho Yang, and Sung Ju Hwang
Federated Learning for User Privacy and Data Confidentiality Workshop @ ICML 2020, **Long Presentation, Best Student Paper Award**
International Conference on Learning Representations (**ICLR**) **2021**, Virtual
- [C3] *Scalable and Order-robust Continual Learning with Additive Parameter Decomposition*
Jaehong Yoon, Saehoon Kim, Eunho Yang, and Sung Ju Hwang
International Conference on Learning Representations (**ICLR**) **2020**, Addis ababa, Ethiopia, Virtual
- [C2] *Lifelong Learning with Dynamically Expandable Networks*
Jaehong Yoon, Eunho Yang, Jeongtae Lee, and Sung Ju Hwang
International Conference on Learning Representations (**ICLR**) **2018**, Vancouver, Canada

- [C1] *Combined Group and Exclusive Sparsity for Deep Neural Networks*
Jaehong Yoon and Sung Ju Hwang
 International Conference on Machine Learning (ICML) 2017, Sydney, Australia
- PREPRINTS
- [P9] *ECofLaP: Efficient Coarse-to-Fine Layer-Wise Pruning for Vision-Language Models*
 Yi-lin Sung, **Jaehong Yoon**, and Mohit Bansal
 Under review, 2023.
- [P8] *Multimodal Representation Learning by Alternating Unimodal Adaptation*
 XiaoHui Zhang, **Jaehong Yoon**, Mohit Bansal, and Huaxiu Yao
 Under review, 2023.
- [P7] *Analyzing and Mitigating Object Hallucination in Large Vision-Language Models*
 Yiyang Zhou*, Chenhang Cui*, **Jaehong Yoon**, Linjun Zhang, Chelsea Finn, Mohit Bansal, and Huaxiu Yao
 Under review, 2023.
- [P6] *Lifelong Audio-video Masked Autoencoder with Forget-robust Localized Alignments*
 Jaewoo Lee*, **Jaehong Yoon***, Wonjae Kim, Yunji Kim, and Sung Ju Hwang
 Under review, 2023.
- [P5] *Carpe Diem: On the Evaluation of World Knowledge in Lifelong Language Models*
 Yujin Lee, **Jaehong Yoon**, Seonghyeon Ye, Sung Ju Hwang, and Se Young Yun
 Under review, 2023.
- [P4] *Progressive Fourier Neural Representation for Sequential Video Compilation*
 Haeyong Kang, **Jaehong Yoon**, Dahyun Kim, Sung Ju Hwang, and Chang D. Yoo
 Under review, arxiv:2306.11305, 2023.
- [P3] *EVEREST: Efficient Masked Video Autoencoder by Removing Redundant Spatiotemporal Tokens*
 Sunil Hwang*, **Jaehong Yoon***, Youngwan Lee*, and Sung Ju Hwang
 Under review, arXiv:2211.10636, 2022.
- [P2] *Rapid Structural Pruning of Neural Networks with Set-based Task-Adaptive Meta-Pruning*
 Minyoung Song, **Jaehong Yoon**, Eunho Yang, and Sung Ju Hwang
 arXiv:2006.12139, 2020.
- [P1] *Adaptive Network Sparsification with Dependent Beta-Bernoulli Dropout*
 Juho Lee, Saehoon Kim, **Jaehong Yoon**, Haebeom Lee, Eunho Yang, and Sung Ju Hwang
 arXiv:1805.10896, 2018.
- WORKSHOP
PRESENTATIONS
- [W1] *BiTAT: Neural Network Binarization with Task-dependent Aggregated Transformation*
 Geon Park*, **Jaehong Yoon***, Haiyang Zhang, Xing Zhang, Sung Ju Hwang, and Yonina C. Eldar
 Computational Aspects of Deep Learning (CADL) Workshop @ ECCV 2022
- PATENTS
(US ONLY)
- Method and Apparatus with Neural Network and Training*
Jaehong Yoon, Saehoon Kim, Eunho Yang, and Sung Ju Hwang
 US 20210256374 A1, Aug 2021
- Electronic Apparatus and Method for Re-learning Trained Model*
Jaehong Yoon, Eunho Yang, Jeongtae Lee, and Sung Ju Hwang
 US 20180357539 A1, Dec 2018

RESEARCH PROJECTS

Center for Applied Research in Artificial Intelligence (CARAI)

funded by [ADD \(Agency for Defense Development\)](#)

Dec 2019 - Dec 2025

Conducted research on tackling noisy and redundant data problems from video stream data for training deep learning algorithms on embedded devices.

Large-Scale Distributed Deep Learning – Neural Research Processing Center

funded by [Samsung Electronics](#)

Dec 2020 - Dec 2022

Conducted research on federated learning algorithms where participating local devices have heterogeneous hardware bit-width specifications.

Learning on the Edge: On-device Real-world Continual Learning

funded by [Microsoft Research Asia](#)

May 2021 - Apr 2022

Conducted research on practical unsupervised continual representation learning algorithms for real-world data where the arriving data stream is barely labeled.

Petaflop-Scale Machine Learning Framework – Next Generation High-Performance Computing

funded by [National Research Foundation](#)

Nov 2016 - Jul 2021

Conducted research on deploying compact/sparse neural networks for high-performance computing via neural pruning and weight quantization.

Specialized Deep Learning Models for Automated Inspection Processes

funded by [LG CNS](#)

Apr 2020 - Dec 2020

Conducted research on automatic/rapid search of sparsified neural networks for target task problems via set-based meta neural pruning.

Efficient Large-Scale Deep Learning – Neural Research Processing Center

funded by [Samsung Electronics](#)

Nov 2017 - Oct 2020

Conducted research on practical federated learning algorithms where each local client trains on non-stationary tasks continually during federated learning, or a server/client has a large amount of unlabeled data for training.

Human-Inspired Large Scale Visual Recognition System

funded by [Samsung Electronics](#)

Dec 2015 - Jan 2020

Conducted research on the training of task-adaptive dynamic neural networks on a sequence of visual recognition tasks.

Simultaneous Object/Scene Recognition and Learning from Driving Videos

funded by [Hyundai Motor Company](#)

Dec 2015 - May 2016

Conducted research on simultaneous object/scene recognition and learning from driving videos.

REVIEWER SERVICES

INTERNATIONAL CONFERENCES

2022 – 2023 *Conference on Lifelong Learning Agents* (COLLAS)

2019 – 2023 *International Conference on Machine Learning* (ICML)

2019 – 2023 *International Conference on Learning Representations* (ICLR)

2018 – 2023 *Neural Information Processing System* (NEURIPS)

2020 *International Joint Conferences on Artificial Intelligence* (IJCAI)

2020 *Association for the Advancement of Artificial Intelligence* (AAAI)

INTERNATIONAL JOURNALS

2022 *Journal of Artificial Intelligence Research* (JAIR)

2020, 2022 *IEEE Transactions on Neural Networks and Learning Systems* (TNNLS)

2021, 2023 *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI)

2021 *IEEE/ACM Transactions on Networking* (TON)

2020 *Neural Networks*

- AWARDS**
- The Best Ph.D. Dissertation Award from KAIST College of Engineering, 2023
 - NeurIPS Top Reviewers Award, 2019
 - NAVER Ph.D. Fellowship Award, 2017
- INVITED TALKS**
- Towards Continuously Evolving AI*
Edinburgh University, 2023
 - Federated and Continual Learning with Heterogeneous Clients*
[Prof. Eric Xing's](#) Group, CMU & MBZUAI, 2023
 - Online Coreset Selection for Rehearsal-based Continual Learning*
[Prof. Kristin Grauman's](#) Group, UT Austin, 2022
 - Representational Continuity for Unsupervised Continual Learning*
Korea Computer Congress (KCC), 2022
 - Lifelong Learning with Dynamically Expandable Networks*
Samsung SDS, 2019
Tech. Talk from NAVER Corp., 2018
Tech. Open Connect (T-T.O.C) from SK-Telecom, 2018
 - Combined Group and Exclusive Sparsity for Deep Neural Networks*
Korea Software Congress (KSC), 2017
- REFERENCES**
- [Prof. Mohit Bansal](#), Professor, University of North Carolina (UNC) Chapel Hill, US
Email: mbansal@cs.unc.edu
 - [Prof. Sung Ju Hwang](#), Associate Professor, KAIST, South Korea
Email: sjhwang82@kaist.ac.kr
 - [Prof. Eunho Yang](#), Associate Professor, KAIST, South Korea
Email: eunhoy@kaist.ac.kr
 - [Dr. Yue Cao](#), Senior Researcher, Microsoft Research Asia, China
Email: caoyue10@gmail.com
 - [Prof. Yonina Eldar](#), Professor, Weizmann Institute of Science, Israel
Email: yonina.eldar@weizmann.ac.il