

Jaehong Yoon

CONTACT INFORMATION

KAIST, South Korea
E-MAIL: jaehong.yoon@kaist.ac.kr
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. student, School of Computing, **Aug 2018 - Current**

- [Machine Learning and Artificial Intelligence \(MLAI\) Lab](#)
- Adviser: [Prof. Sung Ju Hwang](#)
- Area of Study: Machine Learning
- Anticipated Graduation Date: **Feb 2023**

[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

Weizmann Institute of Science, Rehovot, Israel

VISITING STUDENT **Oct 2022 - Nov 2022**

- Host: [Prof. Yonina Eldar](#)

Microsoft Research, Beijing, China

RESEARCH INTERNSHIP **Nov 2021 - Apr 2022**

- Visual Computing Group
- Mentor: [Dr. Yue Cao](#)

MLAI Lab., KAIST, Daejeon, South Korea

CONTRACT RESEARCH SCIENTIST **Feb 2018 - Aug 2018**

AITRICS, Seoul, South Korea

RESEARCH INTERNSHIP **Mar 2018 - May 2018**

- [C10] **On the Soft-Subnetwork for Few-shot Class Incremental Learning**
Haeyong Kang, [Jaehong Yoon](#), Sultan Rizky Hikmawan Madjid, Sung Ju Hwang, Chang D. Yoo
International Conference on Machine Learning ([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 J. L. Mina*, Sultan R. H. 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 Machine Learning ([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 Machine Learning ([ICLR](#)) **2022**, Virtual

- [C5] **Federated Continual Learning with Weighted Inter-client Transfer**
[Jaehong Yoon*](#), Wonyong Jeong*, Giwoong Lee, Eunho Yang, and Sung Ju Hwang
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
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
- [P5] **Continual Learners are Incremental Model Generalizers**
[Jaehong Yoon](#), Sung Ju Hwang, Yue Cao
 Under review, 2022.
- [P4] **Efficient Video Representation Learning via Masked Video Modeling with Motion-centric Token Selection**
 Sunil Hwang*, [Jaehong Yoon*](#), Youngwan Lee, Sung Ju Hwang
 Under review, arXiv:2211.10636, 2022.
- [P3] **Personalized Subgraph Federated Learning**
 Jinheon Baek*, Wonyong Jeong*, Jiongdao Jin, [Jaehong Yoon](#), and Sung Ju Hwang
 Under review, arXiv:2206.10206, 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
- [W3] **BiTAT: Neural Network Binarization with Task-dependent Aggregated Transformation**
 Geon Park*, [Jaehong Yoon*](#), Haiyang Zhang, Xing Zhang, Sung Ju Hwang, and Yonina C. Eldar
[ECCV Workshop](#) on Computational Aspects of Deep Learning (CADL), ECCV 2022
- [W2] **Federated Semi-supervised Learning with Inter-client Consistency**
 Wonyong Jeong, [Jaehong Yoon](#), Eunho Yang, and Sung Ju Hwang
[ICML Workshop](#) on Federated Learning for User Privacy and Data Confidentiality, ICML 2020, [Long Presentation](#), [Best Student Paper Award](#)
- [W1] **Federated Continual Learning with Weighted Inter-client Transfer**
[Jaehong Yoon*](#), Wonyong Jeong*, Giwoong Lee, Eunho Yang, and Sung Ju Hwang
[ICML Workshop](#) on Lifelong Machine Learning, ICML 2020
- 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

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 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 automatically/rapidly search of sparsified neural networks for target task problem 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/clients have 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 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 *Conference on Lifelong Learning Agents* (CoLLAs)
- 2019 – 2022 *International Conference on Machine Learning* (ICML)
- 2019 – 2023 *International Conference on Learning Representations* (ICLR)
- 2018 – 2022 *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 *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI)
- 2021 *IEEE/ACM Transactions on Networking* (TON)
- 2020 *Neural Networks*

AWARDS

NAVER Ph.D. Fellowship Award, 2017

INVITED TALKS

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. Sung Ju Hwang](#), Associate Professor, KAIST
Email: sjhwang82@kaist.ac.kr
- [Prof. Eunho Yang](#), Associate Professor, KAIST
Email: eunhoy@kaist.ac.kr
- [Prof. Yonina Eldar](#), Professor, Weizmann Institute of Science, Israel
Email: yonina.eldar@weizmann.ac.il
- [Dr. Yue Cao](#), Senior Researcher, Microsoft Research Asia
Email: caoyue10@gmail.com