

# Jaehong Yoon

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## CONTACT INFORMATION

KAIST, South Korea  
E-MAIL: [jaehong.yoon@kaist.ac.kr](mailto: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**

- [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

- [P6] **Continual Learners are Incremental Model Generalizers**  
[Jaehong Yoon](#), Sung Ju Hwang, Yue Cao  
 Under review, 2022.
- [P5] **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.
- [P4] **On the Soft-Subnetwork for Few-shot Class Incremental Learning**  
 Haeyong Kang, [Jaehong Yoon](#), Sultan Rizky Hikmawan Madjid, Sung Ju Hwang, Chang D. Yoo  
 Under review, arXiv:2209.07529, 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	<p>INTERNATIONAL CONFERENCES</p> <ul style="list-style-type: none"> <li>• 2022 <i>Conference on Lifelong Learning Agents</i> (CoLLAs)</li> <li>• 2019 – 2022 <i>International Conference on Machine Learning</i> (ICML)</li> <li>• 2019 – 2023 <i>International Conference on Learning Representations</i> (ICLR)</li> <li>• 2018 – 2022 <i>Neural Information Processing System</i> (NEURIPS)</li> <li>• 2020 <i>International Joint Conferences on Artificial Intelligence</i> (IJCAI)</li> <li>• 2020 <i>Association for the Advancement of Artificial Intelligence</i> (AAAI)</li> </ul> <p>INTERNATIONAL JOURNALS</p> <ul style="list-style-type: none"> <li>• 2022 <i>Journal of Artificial Intelligence Research</i> (JAIR)</li> <li>• 2020, 2022 <i>IEEE Transactions on Neural Networks and Learning Systems</i> (TNNLS)</li> <li>• 2021 <i>IEEE Transactions on Pattern Analysis and Machine Intelligence</i> (TPAMI)</li> <li>• 2021 <i>IEEE/ACM Transactions on Networking</i> (TON)</li> <li>• 2020 <i>Neural Networks</i></li> </ul>
AWARDS	NAVER Ph.D. Fellowship Award, 2017
INVITED TALKS	<p>REPRESENTATIONAL CONTINUITY FOR UNSUPERVISED CONTINUAL LEARNING</p> <ul style="list-style-type: none"> <li>• Korea Computer Congress (KCC), 2022</li> </ul> <p>LIFELONG LEARNING WITH DYNAMICALLY EXPANDABLE NETWORKS</p> <ul style="list-style-type: none"> <li>• Samsung SDS, 2019</li> <li>• Tech. Talk from NAVER Corp., 2018</li> <li>• Tech. Open Connect (T-T.O.C) from SK-Telecom, 2018</li> </ul> <p>COMBINED GROUP AND EXCLUSIVE SPARSITY FOR DEEP NEURAL NETWORKS</p> <ul style="list-style-type: none"> <li>• Korea Software Congress (KSC), 2017</li> </ul>
REFERENCES	<ul style="list-style-type: none"> <li>• <b>Prof. Sung Ju Hwang</b>, Associate Professor, KAIST Email: <a href="mailto:sjhwang82@kaist.ac.kr">sjhwang82@kaist.ac.kr</a></li> <li>• <b>Prof. Eunho Yang</b>, Associate Professor, KAIST Email: <a href="mailto:eunhoy@kaist.ac.kr">eunhoy@kaist.ac.kr</a></li> <li>• <b>Prof. Yonina Eldar</b>, Professor, Weizmann Institute of Science, Israel Email: <a href="mailto:yonina.eldar@weizmann.ac.il">yonina.eldar@weizmann.ac.il</a></li> <li>• <b>Dr. Yue Cao</b>, Senior Researcher, Microsoft Research Asia Email: <a href="mailto:caoyue10@gmail.com">caoyue10@gmail.com</a></li> </ul>