

# Dr. Jaehong Yoon

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## CONTACT INFORMATION

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

## RESEARCH INTERESTS

I've been focusing on tackling practical and real-world challenges to understand humans and impact our real lives through ever-evolving embodied AI systems with multiple agents & modalities. My research interest includes the following topics:

- [Multimodal/Video Large Language Models](#): Comprehension, Generation, and Faithfulness
- [Compositional Generalization](#): Continual Learning and Compositional Reasoning
- [Efficient Training/Inference](#): Parameter-efficient Learning, Model Compression, and Federated Learning

## RESEARCH EXPERIENCE

Postdoctoral Research Associate, UNC Chapel-Hill, US **08/2023 - Current**  
Advisor: [Prof. Mohit Bansal](#)

Postdoctoral Research Associate, KAIST, South Korea **03/2023 - 08/2023**  
Advisor: [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**

## EDUCATION

[KAIST](#), Daejeon, South Korea **Aug 2018 - Feb 2023**  
Ph.D., School of Computing,  
• 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 **Aug 2016 - Feb 2018**  
M.S., Computer Science,  
• 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

## CONFERENCE PUBLICATIONS

\*: equal contribution

[C18] *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  
NeurIPS 2023 Workshop on Synthetic Data Generation with Generative AI, [Oral](#)  
The North American Chapter of the Association for Computational Linguistics ([NAACL](#))  
[2024](#), Mexico City, Mexico

- [C17] *Multimodal Representation Learning by Alternating Unimodal Adaptation*  
 XiaoHui Zhang, **Jaehong Yoon**, Mohit Bansal, and Huaxiu Yao  
 The IEEE/CVF Computer Vision and Pattern Recognition Conference (**CVPR**) 2024, Seattle, Washington
- [C16] *ECoFLaP: Efficient Coarse-to-Fine Layer-Wise Pruning for Vision-Language Models*  
 Yi-lin Sung, **Jaehong Yoon**, and Mohit Bansal  
 International Conference on Learning Representations (**ICLR**) 2024, Vienna, Austria
- [C15] *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  
 NeurIPS 2023 Workshop on Instruction Tuning and Instruction Following  
 International Conference on Learning Representations (**ICLR**) 2024, Vienna, Austria
- [C14] *Progressive Fourier Neural Representation for Sequential Video Compilation*  
 Haeyong Kang, **Jaehong Yoon**, Dahyun Kim, Sung Ju Hwang, and Chang D. Yoo  
 International Conference on Learning Representations (**ICLR**) 2024, Vienna, Austria
- [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\*, Jiongdoo 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  
 ICML 2020 Workshop on Lifelong Machine Learning Workshop  
 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  
ICML 2020 Workshop on Federated Learning for User Privacy and Data Confidentiality Workshop, **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

- [P8] *SELMA: Learning and Merging Skill-Specific Text-to-Image Experts with Auto-Generated Data*  
Jialu Li, Jaemin Cho, Yi-lin Sung, [Jaehong Yoon](#), and Mohit Bansal  
arXiv:2403.06952, 2024.
- [P7] *CREMA: Multimodal Compositional Video Reasoning via Efficient Modular Adaptation and Fusion*  
Shoubin Yu\*, [Jaehong Yoon\\*](#), and Mohit Bansal  
arXiv:2402.05889, 2024.
- [P6] *BECoTTA: Input-dependent Online Blending of Experts for Continual Test-time Adaptation*  
Daeun Lee\*, [Jaehong Yoon\\*](#), and Sung Ju Hwang  
arXiv:2402.08712, 2024.
- [P5] *Mementos: A Comprehensive Benchmark for Multimodal Large Language Model Reasoning over Image Sequences*  
Xiyao Wang, Yuhang Zhou, Xiaoyu Liu, Hongjin Lu, Yuancheng Xu, Feihong He, [Jaehong Yoon](#), Taixi Lu, Gedas Bertasius, Mohit Bansal, Huaxiu Yao, and Furong Huang  
arXiv:2401.10529, 2024.
- [P4] *Lifelong Audio-video Masked Autoencoder with Forget-robust Localized Alignments*  
Jaewoo Lee\*, [Jaehong Yoon\\*](#), Wonjae Kim, Yunji Kim, and Sung Ju Hwang  
arXiv:2310.08204, 2023.
- [P3] *EVEREST: Efficient Masked Video Autoencoder by Removing Redundant Spatiotemporal Tokens*  
Sunil Hwang\*, [Jaehong Yoon\\*](#), Youngwan Lee\*, and Sung Ju Hwang  
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  
[ECCV 2022](#) Workshop on Computational Aspects of Deep Learning (CADL)
- 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 - Aug 2023  
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 – 2024 *Conference on Lifelong Learning Agents (CoLLAs)*  
 2019 – 2024 *International Conference on Machine Learning (ICML)*  
 2019 – 2024 *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

*Lightweight Video & Multimodal Learning*  
 LG AI, 2023

*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](mailto:mbansal@cs.unc.edu)

**Prof. Sung Ju Hwang**, Associate Professor, KAIST, South Korea  
 Email: [sjhwang82@kaist.ac.kr](mailto:sjhwang82@kaist.ac.kr)

**Prof. Eunho Yang**, Associate Professor, KAIST, South Korea  
 Email: [eunhoy@kaist.ac.kr](mailto:eunhoy@kaist.ac.kr)

**Dr. Yue Cao**, Senior Researcher, Microsoft Research Asia, China  
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**Prof. Yonina Eldar**, Professor, Weizmann Institute of Science, Israel  
Email: [yonina.eldar@weizmann.ac.il](mailto:yonina.eldar@weizmann.ac.il)