

# Juho Lee

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Github: <https://github.com/juho-lee>

## 1 Academic History

- Sep 2023 - Present: Associate professor.  
Kim Jaechul Graduate School of AI, KAIST.
- July 2020 - Aug 2023: Assistant professor.  
Kim Jaechul Graduate School of AI, KAIST.
- Feb 2018 - Feb 2019: Postdoctoral Research Assistant.  
Department of Statistics, University of Oxford.  
Supervisor: François Caron.
- Mar 2011 - Feb 2018: Master of Science and Doctor of Philosophy (integrated).  
Department of Computer Science and Engineering, POSTECH.  
Supervisor: Seungjin Choi.  
Thesis: *Efficient Bayesian Nonparametric Inference: Tree-Based Methods and Power-Law Models*.  
GPA: 4.05/4.30.
- Mar 2007 - Feb 2011: Bachelor of Computer Science and Engineering.  
Department of Computer Science and Engineering, POSTECH.  
GPA: 3.99/4.30 (*Summa Cum Laude*, 1st in department).

## 2 Industrial Activities

- Sep 2017 - June 2020: Research Scientist.  
AITRICS.  
Developing deep learning technologies for interpretable medical artificial intelligence.

## 3 Research Interests

- Bayesian deep learning and deep Bayesian learning.
- Bayesian nonparametric models.
- Diffusion models.
- Random graph models.
- Deep learning for healthcare

## 4 Publications

### 4.1 Preprints

5. François Caron, Fadhel Ayed, Paul Jung, Hoil Lee, **Juho Lee**, and Hongseok Yang.  
Over-parameterised shallow neural networks with asymmetrical node scaling: global convergence guarantees and feature learning.  
*arXiv:2302.01002*, 2023.
4. Saehoon Kim, Sungwoong Kim, and **Juho Lee**.  
Hybrid generative-contrastive representation learning.  
*arXiv:2106.06162*, 2021.
3. Jihoon Ko, Taehyung Kwon, Kijung Shin, and **Juho Lee**.  
Learning to pool in graph neural networks for extrapolation.  
<https://arxiv.org/abs/2106.06210> *arXiv:2106.06210*, 2021.
2. **Juho Lee**, Yoonho Lee, and Yee Whye Teh.  
Deep amortized clustering.  
*arXiv:1909.13433*, 2019.
1. **Juho Lee**, Saehoon Kim, Jaehong Yoon, Hae Beom Lee, Eunho Yang, and Sung Ju Hwang.  
Adaptive network sparsification via dependent variational beta-Bernoulli dropout.  
*arXiv:1805.10896v2*, 2018.

### 4.2 International Journals

4. Hoil Lee, Fadhel Ayed, Paul Jung, **Juho Lee**, Hongseok Yang, and François Caron.  
Deep neural networks with dependent weights: Gaussian process mixture limit, heavy tails, sparsity and compressibility.  
*Journal of Machine Learning Research*, September 2023.
3. **Juho Lee**, Xenia Miscouridou, and François Caron.  
A unified construction for series representations and finite approximations of completely random measures.  
Bernoulli, August 2023.
2. Fadhel Ayed, **Juho Lee**, François Caron.  
The Normal-Generalised Gamma-Pareto process: a novel pure-jump Lévy process with flexible tail and jump-activity properties.  
*Bayesian Analysis*, December 2022.
1. Hwan-Jin Song, Soonyoung Roh, **Juho Lee**, Giung Nam, Eunggu Yun, Jongmin Yoon, and Park Sa Kim.  
Benefits of stochastic weight averaging in developing neural network radiation scheme for numerical weather prediction.  
*Journal of Advances in Modeling Earth Systems*, October 2022

### 4.3 Workshop contributions

10. Byung-Hoon Kim, Jungwon Choi, Eunggu Yun, Kyungsang Kim, Xiang Li, and **Juho Lee**. Large-scale graph representation learning of dynamic brain connectome with transformers. *NeurIPS 2023 Workshop on Temporal Graph Learning*, 2023, *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2024 .
9. Jungwon Choi, Seongho Keum, Eunggu Yun, Byung-Hoon Kim, and **Juho Lee**. A generative self-supervised framework using functional connectivity in fMRI data. *NeurIPS 2023 Workshop on Temporal Graph Learning*, 2023.
8. Taehong Moon, Moonseok Choi, Eunggu Yun, Jongmin Yoon, Gayoung Lee, and **Juho Lee**. Early exiting for accelerated inference in diffusion models. *ICML 2023 Workshop on Structured Probabilistic Inference & Generative Modeling*, 2023.
7. Balhae Kim, Hyungi Lee, and **Juho Lee**. Function space Bayesian pseudocoreset for Bayesian neural networks. *ICML 2023 Workshop on Structured Probabilistic Inference & Generative Modeling*, 2023
6. Sanghyun Kim, Seohyeon Jung, Balhae Kim, Moonseok Choi, Jinwoo Shin, and **Juho Lee**. Towards safe self-distillation of internet-scale text-to-image diffusion models. *ICML 2023 Workshop on Challenges in Deployable Generative AI*, 2023.
5. Sanghyun Kim, Jungwon Choi, NamHee Kim, Jaesung Ryu, and **Juho Lee**. Modeling uplift from observational time-series in continual scenarios. *AAAI23 Bridge on Continual Causality*, 2023.
4. Taehong Moon, Moonseok Choi, Gayoung Lee, Jung-Woo Ha, and **Juho Lee**. Fine-tuning diffusion models with limited data. *NeurIPS 2022 Workshop on Score-Based Methods*, 2022
3. Hyunsu Kim, **Juho Lee**, and Hongseok Yang. Adaptive strategy for resetting a non-stationary Markov chain during learning via joint stochastic approximation. *Third Symposium on Advances in Approximate Bayesian Inference*, 2021.
2. **Juho Lee**, Yoonho Lee, and Yee Whye Teh. Towards deep amortized clustering. *NeurIPS 2019 Sets & Partitions workshop (contributed talk)*.
1. Tony Duan and **Juho Lee**. Graph embedding VAE: a permutation invariant model of graph structure. *NeurIPS 2019 Graph Representation Learning workshop*.

### 4.4 International Conferences

53. Chaeyun Jang\*, Hyungi Lee\*, Jungtaek Kim, and **Juho Lee**. Model fusion through Bayesian optimization in language model fine-tuning. *Advances in Neural Information Processing Systems (NeurIPS)*, 2024 (**spotlight**).

52. Giung Nam and **Juho Lee**.  
Ex Uno Pluria: insights on ensembling in low precision number systems.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2024.
51. Gyeonghoon Ko, Hyunsu Kim, and **Juho Lee**.  
Learning infinitesimal generators of continuous symmetries from data.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2024.
50. Byoungwoo Park, Jungwon Choi, Sungbin Lim, and **Juho Lee**.  
Stochastic optimal control for diffusion bridges in function spaces.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2024.
49. Sanghyun Kim, Seohyeon Jung, Balhae Kim, Moonseok Choi, Jinwoo Shin, **Juho Lee**.  
Safeguard text-to-image diffusion models with human feedback inversion.  
*European Conference on Computer Vision (ECCV)*, 2024.
48. Hyunsu Kim, Yegon Kim, Hongseok Yang, and **Juho Lee**.  
Variational partial group convolutions for input-aware partial equivariance of rotations and color-shifts.  
*International Conference on Machine Learning (ICML)*, 2024.
47. Taehong Moon, Moonseok Choi, EungGu Yun, Jongmin Yoon, Gayoung Lee, Jaewoong Cho, and **Juho Lee**.  
A simple early exiting framework for accelerated sampling in diffusion models.  
*International Conference on Machine Learning (ICML)*, 2024.
46. Seunghyun Kim, Seohyeon Jung, Seonghyeon Kim, and **Juho Lee**.  
Learning to explore for stochastic gradient MCMC.  
*International Conference on Machine Learning (ICML)*, 2024.
45. Hyunsu Kim, Jongmin Yoon, and **Juho Lee**.  
Fast ensembling with diffusion Schrödinger bridge.  
*International Conference on Learning Representations (ICLR)*, 2024.
44. Moonseok Choi, Hyungi Lee, Giung Nam, and **Juho Lee**.  
Sparse weight averaging with multiple particles for iterative magnitude pruning.  
*International Conference on Learning Representations (ICLR)*, 2024.
43. Giung Nam, Byeongho Heo, and **Juho Lee**.  
Lipsum-FT: robust fine-tuning of zero-shot models using random text guidance.  
*International Conference on Learning Representations (ICLR)*, 2024.
42. Hyungi Lee, Giung Nam, Edwin Fong, and **Juho Lee**.  
Enhancing transfer learning with flexible nonparametric posterior sampling.  
*International Conference on Learning Representations (ICLR)*, 2024.
41. Dong Bok Lee, Seanie Lee, Joonho Ko, Kenji Kawaguchi, **Juho Lee**, and Sung Ju Hwang.  
Self-supervised dataset distillation for transfer learning.  
*International Conference on Learning Representations (ICLR)*, 2024.

40. Dongjin Lee, **Juho Lee**, and Kijung Shin.  
Spear and shield: adversarial attacks and defense methods for model-based link prediction on continuous-time dynamic graphs.  
*AAAI Conference on Artificial Intelligence (AAAI)*, 2024.
39. Balhae Kim, Hyungi Lee, and **Juho Lee**.  
Function space Bayesian pseudocoresets for Bayesian neural networks.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
38. SeungHyun Kim\*, Hyunsu Kim\*, Eunggu Yun\*, Hwangrae Lee, Jaehun Lee, and **Juho Lee**.  
Probabilistic imputation for time-series classification with missing data.  
*International Conference on Machine Learning (ICML)*, 2023 (\*: equal contribution).
37. Eunggu Yun\*, Hyungi Lee\*, Giung Nam\*, and **Juho Lee**.  
Traversing between modes in function space for fast ensembling.  
*International Conference on Machine Learning (ICML)*, 2023 (\*: equal contribution).
36. Hyunsu Kim, Hyungi Lee, Hongseok Yang, and **Juho Lee**.  
Regularizing towards soft equivariance under mixed symmetries.  
*International Conference on Machine Learning (ICML)*, 2023.
35. Jeffrey Ryan Willette\*, Seanie Lee\*, Bruno Andreis, Kenji Kawaguchi, **Juho Lee**, and Sung Ju Hwang.  
Scalable set encoding with universal mini-batch consistency and unbiased full set gradient approximation.  
*International Conference on Machine Learning (ICML)*, 2023 (\*: equal contribution).
34. Hyungi Lee, Eunggu Yun, Giung Nam, Edwin Fong, and **Juho Lee**.  
Martingale posterior neural processes.  
*International Conference on Learning Representations (ICLR)*, 2023 (**spotlight**).
33. Giung Nam, Sunguk Jang, and **Juho Lee**.  
Decoupled training for long-tailed classification with stochastic representations.  
*International Conference on Learning Representations (ICLR)*, 2023.
32. Seohyeon Jung, Sanghyun Kim, and **Juho Lee**.  
A simple yet powerful deep active learning with snapshot ensembles.  
*International Conference on Learning Representations (ICLR)*, 2023.
31. Seanie Lee, Minki Kang, **Juho Lee**, Sung Ju Hwang, and Kenji Kawaguchi.  
Self-distillation for further pre-training of transformers.  
*International Conference on Learning Representations (ICLR)*, 2023.
30. Youngwan Lee, Jeffrey Ryan Willette, Jonghee Kim, **Juho Lee**, and Sung Ju Hwang.  
Exploring the role of mean teachers in self-supervised masked auto-encoders.  
*International Conference on Learning Representations (ICLR)*, 2023.
29. Seanie Lee, Bruno Andreis, Kenji Kawaguchi, **Juho Lee**, and Sung Ju Hwang.  
Set-based meta-interpolation for few-task meta-learning.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2022.

28. Balhae Kim, Jungwon Choi, Seanie Lee, Yoonho Lee, Jung-Woo Ha, and **Juho Lee**.  
On divergence measures for Bayesian pseudocoresets.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2022.
27. Giung Nam, Hyungi Lee, Byeongho Heo, and **Juho Lee**.  
Improving ensemble distillation with weight averaging and diversifying perturbation.  
*International Conference on Machine Learning (ICML)*, 2022.
26. Bruno Andreis, Seanie Lee, A. Tuan Nguyen, **Juho Lee**, Eunho Yang, and Sung Ju Hwang  
Set based stochastic subsampling.  
*International Conference on Machine Learning (ICML)*, 2022.
25. Hyungi Lee, Eunggu Yoon, Hongseok Yang, and **Juho Lee**.  
Scale mixtures of neural network Gaussian processes.  
*International Conference on Learning Representations (ICLR)*, 2022.
24. Seanie Lee, Hae Beom Lee, **Juho Lee**, and Sung Ju Hwang.  
Sequential Reptile: inter-task gradient alignment for multilingual learning.  
*International Conference on Learning Representations (ICLR)*, 2022.
23. Jeffrey Ryan Willette, Hae Beom Lee, **Juho Lee**, and Sung Ju Hwang.  
Meta learning low rank covariance factors for energy-based deterministic uncertainty. *International Conference on Learning Representations (ICLR)*, 2022.
22. Giung Nam\*, Jongmin Yoon\*, Yoonho Lee, and **Juho Lee**.  
Diversity matters when learning from ensembles.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021 (\*: equal contribution).
21. Andreis Bruno, Jeffrey Ryan Willette, **Juho Lee**, and Sung Ju Hwang.  
Mini-batch consistent slot set encoder for scalable set encoding.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021.
20. Yanbin Liu, **Juho Lee**, Linchao Zhu, Ling chen, Humphrey Shi, and Yi Yang.  
A multi-mode modulator for multi-domain few-shot classification.  
*International Conference on Computer Vision (ICCV)*, 2021.
19. Jongmin Yoon, Sung Ju Hwang, and **Juho Lee**.  
Adversarial purification with score-based generative models.  
*International Conference on Machine Learning (ICML)*, 2021.
18. Seanie Lee, Minki Kang, **Juho Lee**, and Sung Ju Hwang.  
Learning to perturb word embeddings for out-of-distribution QA.  
*Meeting of the Association for Computational Linguistics (ACL)*, 2021 (full paper).
17. Jinwoo Kim\*, Jaehoon Yoo\*, **Juho Lee**, and Seunghoon Hong.  
SetVAE: learning hierarchical composition for generative modelling of set-structured data.  
*Computer Vision and Pattern Recognition (CVPR)*, 2021 (\*: equal contribution).
16. **Juho Lee\***, Yoonho Lee\*, Jungtaek Kim, Sung Ju Hwang, Eunho Yang, and Yee Whye Teh.  
Bootstrapping neural processes.

- Advances in Neural Information Processing Systems (NeurIPS)*, 2021 (\*: equal contribution).
15. Yoonho Lee, **Juho Lee**, Eunho Yang, Sung Ju Hwang, and Seungjin Choi.  
Neural complexity measures.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021.
  14. Jay Heo, Junhyeon Park, Hyewon Jeong, Kwang Joon Kim, **Juho Lee**, Eunho Yang, and Sung Ju Hwang.  
Cost-effective interactive attention learning with neural attention processes.  
*International Conference on Machine Learning (ICML)*, 2020.
  13. Ingyo Chung, Saehoon Kim, **Juho Lee**, Sung Ju Hwang, and Eunho Yang.  
Deep mixed effect model using Gaussian processes: a personalized and reliable prediction for healthcare.  
*AAAI Conference on Artificial Intelligence (AAAI)*, 2020 (to appear).
  12. Fadhel Ayed\*, **Juho Lee**\*, and François Caron.  
Beyond the Chinese restaurant and Pitman-Yor processes: statistical models with double power-law behavior.  
*International Conference on Machine Learning (ICML)*, 2019 (\*: equal contribution, **long oral**).
  11. **Juho Lee**, Yoonho Lee, Jungtaek Kim, Adam R. Kosiorek, Seungjin Choi, and Yee Whye Teh. Set transformer: a framework for attention-based permutation-invariant neural networks. *International Conference on Machine Learning (ICML)*, 2019.
  10. Yanbin Liu, **Juho Lee**, Minseop Park, Saehoon Kim, Eunho Yang, Sung Ju Hwang, and Yi Yang.  
Learning to propagate labels: transductive propagation network for few-shot learning.  
*International Conference on Learning Representations (ICLR)*, 2019.
  9. **Juho Lee**, Lancelot F. James, Seungjin Choi, and François Caron.  
A Bayesian model for sparse graphs with flexible degree distribution and overlapping community structure.  
*International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2019 (**oral**).
  8. Jay Heo\*, Hae Beom Lee\*, Saehoon Kim, **Juho Lee**, Kwang Joon Kim, Eunho Yang, and Sung Ju Hwang (\*: equal contribution).  
Uncertainty-aware attention for reliable interpretation and prediction.  
*Neural Information Processing Systems (NeurIPS)*, 2018.
  7. Hae Beom Lee, **Juho Lee**, Saehoon Kim, Eunho Yang, and Sung Ju Hwang.  
Dropmax: adaptive variational softmax.  
*Neural Information Processing Systems (NeurIPS)*, 2018
  6. **Juho Lee**, Creighton Heakulani, Zoubin Ghahramani, Lancelot F. James, and Seungjin Choi.  
Bayesian inference on random simple graphs with power law degree distributions.  
*International Conference on Machine Learning (ICML)*, 2017.

5. **Juho Lee**, Lancelot F. James, and Seungjin Choi.  
Finite-dimensional BFRY priors and variational Bayesian inference for power law models.  
*Advances in Neural Information Processing Systems (NIPS)*, 2016.
4. **Juho Lee** and Seungjin Choi.  
Tree-guided MCMC inference for normalized random measure mixture models.  
*Advances in Neural Information Processing Systems (NIPS)*, 2015.
3. **Juho Lee** and Seungjin Choi.  
Bayesian hierarchical clustering with exponential family: Small-variance asymptotics and reducibility.  
*International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2015.
2. **Juho Lee** and Seungjin Choi.  
Incremental tree-based inference with dependent normalized random measures.  
*International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2014.
1. **Juho Lee**, Suha Kwak, Bohyung Han, and Seungjin Choi.  
On-line video segmentation by Bayesian split-merge clustering.  
*European Conference on Computer Vision (ECCV)*, 2012.

## 5 Academic Services

- Area chair: NeurIPS (2023-2024), ICLR (2025), ACML (2025)
- Reviewer: NeurIPS, ICLR, ICML, AISTATS (since 2012), ECCV, CVPR, ICCV

## 6 Invited Talks

- Generative modeling with diffusion models, Samsung Advanced Institute of Technology (South Korea), September 2024.
- Sequential decision making with Bayesian deep learning, Samsung Advanced Institute of Technology (South Korea), July 2024.
- Flexible Bayesian nonparametric transfer learning with large-scale models, Workshop on Bayesian learning and network analysis, VIASM (Vietnam), July 2024.
- Toward scalable and generalizable Bayesian deep learning, The 2nd Bayes Duality Workshop, RIKEN ABI Team (Japan), June 2024.
- Scaling Bayesian deep learning for fast and accurate inference, Back to the Future: Robot Learning Going Probabilistic Workshop @ ICRA 2024 (Japan), May 2024.
- Ensemble methods for Bayesian deep learning, Samsung Advanced Institute of Technology (South Korea), May 2024.
- Variational Inference for Bayesian deep learning, Samsung Advanced Institute of Technology (South Korea), April 2024.



- Scalable approaches for Bayesian pseudocoresets, RIKEN ABI Team (Japan), February 2024.
- Uncertainty quantification with Bayesian deep learning, Samsung Advanced Institute of Technology (South Korea), January 2024.
- Diversity matters when learning from ensembles, Korean Institute of Information Scientists and Engineers (South Korea), June 2022.
- Finite dimensional approximation for completely random measures, POSTECH (South Korea), May 2022.
- Gaussian processes and neural processes, Korean Institute of Information Scientists and Engineers (South Korea), February 2023.
- AI and mind, Yonsei University College of Medicine (South Korea), November 2021.
- Bayesian inference with neural networks, Korea Research Institute of Standards and Science (South Korea), October 2021.
- Bootstrapping neural processes, Korean Institute of Information Scientists and Engineers (South Korea), December 2020.
- Bayesian deep learning, Hyundai NGV (South Korea), September 2020.

## **7 Honors**

- ICML student travel award (2017).
- NIPS student travel award (2016).
- Global Ph.D fellowship (National Research Foundation of Korea, 2011-2012).
- Chung-Am graduate fellowship (POSTECH, 2011-2013).

## **8 Research Projects**

### **8.1 Ongoing projects**

- Meta-learning algorithms for real-world problems (Apr 2022 - Dec 2024).  
Institute of Information & communications Technology Planning & Evaluation (IITP).
- Accelerating generation speed of diffusion-based generative models (Jul 2021 - June 2023).  
Naver (KAIST-NAVER Hypercreative AI Center).
- Bayesian inference for time-series data with missing values (Dec 2021 - Dec 2023).  
Samsung Electronics.
- Developing deep learning algorithm for anxiety disorder analysis using multi-modal data (Jul 2021 - Dec 2025).  
National Research Foundation of Korea.

- Developing artificial intelligence based emulator for physics processes in numerical models (May 2021 - Dec 2024).  
National Institute of Meteorological Sciences.
- Learning robust deep neural networks via bootstrap (Sep 2020 - Sep 2022).  
Samsung Electronics.

## 8.2 Past Projects

- Data-driven uncertainty quantification for deep learning (Jun 2021 - May 2021).  
National Research Foundation of Korea.
- Face clustering system with human tagging (Apr 2012 - Dec 2012).  
Samsung Digital Media & Communications Research & Development center.
- Incremental learning for face verification (Apr 2013 - Dec 2013).  
Samsung Digital Media & Communications Research & Development center.
- Basic software research in human-level lifelong machine learning (Apr 2014 - Feb 2018).  
Ministry of Science and ICT (MSIT)/IITP.
- Action recognition with smart devices (Aug 2015 - Jul 2016).  
Samsung Electronics.
- Incremental learning for deep learning based image classification systems with novel class detection (Mar 2016 - Dec 2016).  
LG Electronics.

## 9 Teaching Experiences

- Bayesian deep learning (AI708), KAIST (2024 Spring).
- Bayesian nonparametric methods for Machine Learning (AI706), KAIST (2023 Spring).
- Bayesian machine learning (AI701), KAIST (2020 Fall, 2021 Fall, 2022 Fall, 2023 Fall, 2024 Fall).
- Machine learning for AI (AI501), KAIST (2021 Spring, 2022 Spring).
- Lecturer for Samsung DS AI expert course (July 2020)
- Lecturer for deep learning/Tensorflow class in POSCO (Jun 2017)
- Lecturer for basic machine learning class in Samsung Research Study Center in GiHeung (Jul 2017)
- Lecturer for deep learning/Tensorflow class in Samsung Research Study Center in GiHeung (Jul 2017)