

Wei Chen

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RESEARCH INTERESTS

Deep learning and computer vision, specifically on representation learning, lifelong learning, model fusion.

EDUCATION

Purdue University	West Lafayette, IN
PhD in Electrical and Computer Engineering	Aug. 2021–Dec. 2026
Carnegie Mellon University	Pittsburgh, PA
Master of Science in Electrical and Computer Engineering, GPA: 3.93/4.0	Jan. 2019–May 2020
Nanjing University	Nanjing, China
Master of Science in Electronic Science and Engineering, GPA: 3.1/4.0	Aug. 2015–Jun. 2018
Nanjing University	Nanjing, China
Bachelor of Science in Physics, GPA: 4.09/5.0	Aug. 2011–Jun. 2015

PUBLICATIONS

- **Wei Chen**, Jingxi Yu, Zichen Miao, Qiang Qiu, *In-Context Compositional Learning via Sparse Coding Transformer*, Conference on Neural Information Processing Systems (NeurIPS), 2025. (24.52% out of 21,575 submissions)
- **Wei Chen**, Jingxi Yu, Zichen Miao, Qiang Qiu, *Sparse Fine-Tuning of Transformers for Generative Tasks*, International Conference on Computer Vision (ICCV), 2025. (24% out of 11,239 submissions)
- **Wei Chen**, Huidong Liu, Yang Liu, Chien-Chih Wang, Moyan Li, Hongdong Li, Bryan Wang, *Zero-shot Customized Video Editing with Diffusion Feature Transfer*, International Conference on Computer Vision (ICCV) - Findings, 2025.
- Zichen Miao*, **Wei Chen***, and Qiang Qiu, *Coeff-Tuning: A Graph Filter Subspace View for Tuning Attention-Based Large Models*, Computer Vision and Pattern Recognition Conference (CVPR), 2025 [**Spotlight**]. (* equal contribution) (top 2.98% out of 13,008 submissions)
- **Wei Chen**, Zichen Miao, and Qiang Qiu, *Large convolutional model tuning via filter subspace*, International Conference on Learning Representations (ICLR), 2025. (31.75% out of 11,672 submissions)
- **Wei Chen***, Zichen Miao*, Qiang Qiu, *Inner Product-based Neural Network Similarity*, Conference on Neural Information Processing Systems (NeurIPS), 2023. (26.1% out of 12,343 submissions)
- Atul Sharma, **Wei Chen**, Joshua Zhao, Qiang Qiu, Saurabh Bagchi, Somali Chaterji, *Flair: Defense Against Model Poisoning Attack in Federated Learning*, ACM Asia Conference on Computer and Communications Security (ASIACCS), 2023.
- Atul Sharma, Joshua C Zhao, **Wei Chen**, Qiang Qiu, Saurabh Bagchi, Somali Chaterji, *How to Learn Collaboratively: Federated Learning to Peer-to-peer Learning and What's at Stake*, International Conference on Dependable Systems and Networks-Supplemental Volume (DSN-S), 2023.
- Zichen Miao, Ze Wang, **Wei Chen**, Qiang Qiu, *Continual Learning with Filter Atom Swapping*, International Conference on Learning Representations (ICLR), 2022 [**Spotlight**]. (top 5% out of 3,391 submissions)
- José Lezama, **Wei Chen**, Qiang Qiu, *Run-Sort-ReRun: Escaping Batch Size Limitations in Sliced Wasserstein Generative Models*, International Conference on Machine Learning (ICML), 2021. (21.5% out of 5,513 submissions)
- Iljoo Baek, **Wei Chen**, Zhihao Zhu, Soheil Samii, Raj Rajkumar, *FT-DeepNets: Fault-Tolerant Convolutional Neural Networks with Kernel-based Duplication*, Winter Conference on Applications of Computer Vision (WACV), 2021.
- Iljoo Baek, **Wei Chen**, Asish Chakrapani Gumparthi Venkat, Ragunathan Raj Rajkumar, *Practical Object Detection Using Thermal Infrared Image Sensors*, Intelligent Vehicles Symposium Workshops (IV Workshops), 2021.
- **Wei Chen***, Kartikeya Bhardwaj*, and Radu Marculescu, *FedMAX: Mitigating Activation Divergence for Effective Federated Learning*, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), 2020. (* equal contribution)

- Kartikeya Bhardwaj, **Wei Chen**, and Radu Marculescu, *New Directions in Distributed Deep Learning: Bringing the Network at Forefront of IoT Design*, Design Automation Conference (DAC), 2020.

PAPERS UNDER REVIEW

- **Wei Chen**, Zhenyuan Dong, Qiang Qiu, *Approaching Effective Merging in Model Embedding Space*, 2026. (under review)
- Taewook Kim, **Wei Chen**, Qiang Qiu, *Addressing Textual Attention Collapse in Personalized Text-to-Image Models via Prior-Guided Attention Adjustment*, 2026. (under review)
- Vishal Purohit, **Wei Chen**, Qiang Qiu, *Blockwise Divide-and-Aggregate for Image Restoration using Diffusion Priors*, 2026. (under review)
- Taewook Kim, **Wei Chen**, Qiang Qiu, *Learning Diverse Textual Contexts for Robust Personalization of Text-to-Image Diffusion Models*, 2026. (under review)
- **Wei Chen**, Qiang Qiu, *Extra Clients at No Extra Cost: Overcome Data Heterogeneity in Federated Learning with Filter Decomposition*, arXiv preprint arXiv:2503.08652, 2024.

EXPERIENCE

Amazon Seattle, WA
Internship May-Aug. 2024

Video Editing with Customized Concept

- Led the project on zero-shot customized video editing in collaboration with three mentors.
- Performed a comprehensive analysis of diffusion features and identified suitable features for video editing.
- Developed an algorithm that learns personalized concepts from multiple images without additional training.
- Implemented optimal transport to maintain high feature correspondence and enhance temporal consistency.
- Achieved a higher CLIP score and temporal consistency compared with SOTA methods such as VideoSwap.

CyLab, Carnegie Mellon University Pittsburgh, PA
Research Assistant May-Dec. 2020

Fault-Tolerant Deep Neural Networks

- Studied influences of feature map error and weight error and provided redundancy to preserve the performance.
- Proposed an entropy-based ranking method for weight selection, achieving 10% better accuracy.
- Established the layer-wise ranking method for duplication selection and further improved the accuracy.

RESEARCH PROJECTS

Understanding Visual Concept Representation in Deep Models Dec. 2024– May 2025
Purdue University West Lafayette, IN

- Explored dictionary-learning frameworks to capture visual concepts as basis elements.
- Developed a sparse fine-tuning method to encode new visual concepts in a learned dictionary representation.
- Enabled continuous and controllable image editing by selectively tuning a small subset of dictionary atoms.
- Improved in-context learning of Transformers using linear compositions over atom coefficients.

Understanding Customized Image Generating Jun. 2024– Dec.2024
Purdue University West Lafayette, IN

- Explored improving semantic alignment in image generation through greater contextual diversity.
- Provided an analytical study on mitigating the overfitting to personalized concepts in image generation.
- Analyzed the self-attention map of the text encoder and showed that its concentration encourages overfitting.

Parameter-efficient Fine-tuning of Large Models Jan. 2023–Nov.2024
Purdue University West Lafayette, IN

- Developed an efficient fine-tuning approach, which tunes less than 1% of the parameters of current large models.
- Implemented our fine-tuning approach on deep models such as Vision Transformer, Stable Diffusion, and BERT.
- Provided a range of configurations tailored to downstream tasks of different scales, from small to large datasets.
- Enabled models to learn personalized concepts while preserving knowledge of pre-trained foundational models.
- Published research papers at the ICLR and CVPR.

Time Aware Machine Intelligence

Purdue University

Jan. 2021–June. 2022

West Lafayette, IN

- Explored the relations among neural networks (NNs) and proposed a framework to integrate their knowledge.
- Invented a data-free measure for NN similarity, achieving *millions of times faster* speed than traditional metrics.
- Implemented an optimal transportation algorithm that effectively adapts knowledge in NNs across domains.
- Created a continual learning framework that combines knowledge over time through an ensemble of similar NNs.
- Delivered time-aware framework achieved SOTA performance in both accuracy and model scalability.

Federated Learning for Non-IID Data

Carnegie Mellon University

May. 2019–May. 2020

Pittsburgh, PA

- Developed a regularization term based on the principle of maximum entropy, addressing non-IID problems in FL.
- Deployed our approach on varied neural network structures for image recognition and next word prediction tasks.
- Our method achieved 4.7% higher accuracy than the baseline FL algorithms.

PROFESSIONAL SERVICES

Conference Reviewer

ECCV (2022-Present), CVPR (2022-Present), NeurIPS (2022-Present), ICML (2023-Present), ICLR (2023-Present)
ICCV (2023-Present)

Honors

ICCV 2025 Outstanding Reviewer (*Top 2.7% out of 11,850 reviewers*)

SKILLS

Programming Languages: Python, C/C++

Learning Platforms: Pytorch, TensorFlow

Deep Learning Models: Stable Diffusion, PixArt, SAM, LLaVA, Grounding-DINO, LLaMA, DINO