

# Yun-Cheng (Joe) Wang

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## Career Objectives

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Research and teaching in 1) sustainable and interpretable AI; 2) generative AI at scale; and 3) domain-specific AI integration (from theory/algorithms to edge-cloud computing infrastructure).

## Education

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**University of Southern California** – Los Angeles, CA Jan 2021 - Dec 2023  
Ph.D. in Electrical Engineering, Minor area in Computer Science  
• Dissertation: *Green Knowledge Graph Completion and Scalable Generative Content Delivery*

**University of Southern California** – Los Angeles, CA Aug 2018 - Dec 2019  
M.S. in Electrical Engineering

**National Taiwan University** – Taipei, Taiwan Sep 2014 - Jun 2018  
B.S. in Electrical Engineering

## Research Area

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- **Sustainable and Interpretable AI**
  - Efficient and interpretable representation learning for high-dimensional data
  - Lightweight foundation models across different modalities (vision, audio, and language)
- **Generative AI at Scale**
  - Collaborative edge-cloud solutions for green generative AI
  - Efficient task offloading for large-scale generative AI services
- **Domain-specific AI Integration**
  - Green AI in healthcare and medicine
  - Green AI in multi-media (vision, audio, and language)

## Employment

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**Senior Machine Learning Engineer**, Apple, Inc. – Cupertino, CA Jan 2025 - Present

**Research Scientist**, Yahoo, Inc. – Mountain View, CA Jan 2024 – Jan 2025

**Research Engineering Intern**, Yahoo, Inc. – Remote May 2023 – Aug 2023

## Teaching Experiences

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**Guest Lecturer** - University of Southern California Fall 2022, Fall 2023  
• Course: Multimedia Compression

**Teaching Assistant** - University of Southern California Spring 2023 - Fall 2023  
• Course: Stochastic Process for Financial Engineering  
• Facilitated course delivery and provided guidance through discussions and office hours

**Course Mentor** - University of Southern California Fall 2019  
• Course: Probability for Electrical and Computer Engineers  
• Supported course design and hosted office hours

## Invited Talks

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- “Scalable Generative Content Delivery”, Research Center for Information Technology Innovation (CITI) at Academia Sinica, Jan 2024.
- “Green Learning with Knowledge Graphs”, National Taiwan University (NTHU), Dec 2023.
- “Knowledge Graph: Foundations and Applications”, National Taiwan Normal University (NTNU), Sep 2020.

## Publications

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### Conference Papers

- [1] Jintang Xue, **Yun-Cheng Wang**, Chengwei Wei, C.-C. Jay Kuo, “Efficient Feature Selection for Word Embedding Dimension Reduction,” *Asia Pacific Signal and Information Processing Association Annual Summit and Conference (ASC)*, 2024.
- [2] Zhanxuan Mei, **Yun-Cheng Wang**, C.-C. Jay Kuo, “GSBIQA: Green Saliency-guided Blind Image Quality Assessment Method,” *Asia Pacific Signal and Information Processing Association Annual Summit and Conference (ASC)*, 2024.
- [3] Tsung-Shan Yang, **Yun-Cheng Wang**, Chengwei Wei, Suya You, C.-C. Jay Kuo, “GMA: Green Multi-Modal Alignment for Image-Text Retrieval,” *Asia Pacific Signal and Information Processing Association Annual Summit and Conference (ASC)*, 2024.
- [4] Tsung-Shan Yang, **Yun-Cheng Wang**, Chengwei Wei, C.-C. Jay Kuo, “GHOI: A Green Human-Object-Interaction Detector,” *IEEE International Conference on Multimedia Information Processing and Retrieval (MIPR)*, 2024.
- [5] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, “AsyncET: Asynchronous Representation Learning for Knowledge Graph Entity Typing,” *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2024.
- [6] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, “GreenKGC: A Lightweight Knowledge Graph Completion Method,” *Annual Meeting of the Association for Computational Linguistics (ACL)*, 2023.
- [7] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “Compounding Geometric Operations for Knowledge Graph Completion,” *Annual Meeting of the Association for Computational Linguistics (ACL)*, 2023.
- [8] Zhanxuan Mei, **Yun-Cheng Wang**, Xingze He, C.-C. Jay Kuo, “GreenBIQA: A Lightweight Blind Image Quality Assessment Method,” *IEEE International Workshop on Multimedia Signal Processing (MMSP)*, 2022. **(Top 10% Paper Award)**
- [9] Bin Wang, Fenxiao Chen, **Yun-Cheng Wang**, C.-C. Jay Kuo, “Efficient Sentence Embedding via Semantic Subspace Analysis,” *IEEE International Conference on Pattern Recognition (ICPR)*, 2020.

### Journal Papers

- [1] Zhanxuan Mei, **Yun-Cheng Wang**, C.-C. Jay Kuo, “Blind Video Quality Assessment at the Edge,” *IEEE Transactions on Multimedia*, 2024.
- [2] Zhanxuan Mei, **Yun-Cheng Wang**, C.-C. Jay Kuo, “GreenSaliency: A Lightweight and Efficient Image Saliency Detection Method,” *APSIPA Transactions on Signal and Information Processing*, 2024.
- [3] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “Knowledge Graph Embedding: An Overview,” *APSIPA Transactions on Signal and Information Processing*, 2024.
- [4] Jintang Xue, **Yun-Cheng Wang**, Chengwei Wei, Xiaofeng Liu, Jonghye Woo, C.-C. Jay Kuo, “Bias and Fairness in Chatbots: An Overview,” *APSIPA Transactions on Signal and Information Processing*, 2024.
- [5] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “Knowledge Graph Embedding with 3D Compound Geometric Transformations,” *APSIPA Transactions on Signal and Information Processing*, 2024.
- [6] Zhanxuan Mei\*, **Yun-Cheng Wang\***, Xingze He, Yong Yan, C.-C. Jay Kuo, “Lightweight High-Performance Blind Image Quality Assessment,” *APSIPA Transactions on Signal and Information Processing*, 2024.

- [7] **Yun-Cheng Wang**, Jintang Xue, Chengwei Wei, C.-C. Jay Kuo, “An Overview on Generative AI at Scale with Edge-Cloud Computing,” *IEEE Open Journal of the Communications Society*, 2023.
- [8] Chengwei Wei, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “An Overview on Language Models: Recent Developments and Outlook,” *APSIPA Transactions on Signal and Information Processing*, 2023.
- [9] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “TypeEA: Type-Associated Embedding for Knowledge Graph Entity Alignment,” *APSIPA Transactions on Signal and Information Processing*, 2023.
- [10] **Yun-Cheng Wang**, Xiou Ge, Bin Wang, C.-C. Jay Kuo, “KGBoost: A Classification-Based Knowledge Base Completion Method with Negative Sampling,” *Pattern Recognition Letters*, 2022.
- [11] Xiou Ge, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “CORE: A Knowledge Graph Entity Type Prediction Method via Complex Space Regression and Embedding,” *Pattern Recognition Letters*, 2022.
- [12] Fenxiao Chen, **Yun-Cheng Wang**, Bin Wang, C.-C. Jay Kuo, “Graph Representation Learning: A Survey,” *APSIPA Transactions on Signal and Information Processing*, 2020. **(2024 Sadaoki Furui Prize Paper Award)**
- [13] Bin Wang, Angela Wang, Fenxiao Chen, **Yun-Cheng Wang**, C.-C. Jay Kuo, “Evaluating Word Embedding Models: Methods and Experimental Results,” *APSIPA Transactions on Signal and Information Processing*, 2019. **(2022 Sadaoki Furui Prize Paper Award)**

### Preprints

- [1] Tsung-Shan Yang, **Yun-Cheng Wang**, Chengwei Wei, Suyu You, C.-C. Jay Kuo, “Efficient Human-Object-Interaction (EHOI) Detection via Interaction Label Coding and Conditional Decision,” *arXiv preprint*, 2024.
- [2] Jintang Xue, **Yun-Cheng Wang**, Chengwei Wei, Xiaofeng Liu, Jonghye Woo, C.-C. Jay Kuo, “Word Embedding Dimension Reduction via Weakly-Supervised Feature Selection,” *arXiv preprint*, 2024.

### Awards

- USC Viterbi Graduate Fellowship/Research Assistantship/Teaching Assistantship Jan 2021 - Dec 2023
- Sadaoki Furui Prize Paper Award (Pioneering Contributions in Speech Processing) APSIPA ASC 2022, 2024
- Top 10% Paper Award IEEE MMSP 2022
- USC EE MS honors program Aug 2019 - Dec 2019

### Research Projects

**Improving Efficiency and Interpretability of Language Models** Aug 2023 - Present

- Developed efficient and reliable generative models for high-stakes domains such as biomedical applications.
- Investigated local n-gram and constituency-dependent n-gram models to simplify the self-attention mechanism.

**Multi-modality Retrieval and Alignment, Sponsored by Army Research Lab (ARL)** Aug 2023 - Present

- Leveraged the embedding space to connect different modalities for multi-modal reasoning.
- Extracted human-object interactions using spatial and latent features with hierarchical classifiers.
- Devised an alignment module in a joint embedding space for text-to-image and image-to-text retrieval.

**Efficient Reasoning on KGs using Lightweight Models** Jan 2021 - Dec 2023

- This project aimed at predicting missing information, including entity types and relations, in KGs using lightweight models.
- Adopted feature pruning to achieve parameter efficiency and SOTA performance in low dimensions.
- Proposed novel modeling of entity types to improve expressiveness while retaining scalability to large KGs.
- Innovated an asynchronous KGE learning framework and achieved SOTA performance for embedding-based models in both link prediction and entity type prediction tasks.
- Reduced the number of inference Floating Point Operations (FLOPs) by over 100×, and the number of parameters by over 15×.

## Scalable Generative AI Services under Edge-Cloud Computing

Jan 2023 - Oct 2023

- Analyzed the memory, computation, and network requirements to deploy GenAI services, e.g., ChatGPT, across different scales.
- Estimated the latency for GenAI services under different communication frameworks.
- Identified considerations when designing GenAI systems with better efficiency, computation offloading, and privacy.

## Build Image and Video Quality Assessment, *Sponsored by Meta Inc.*

Aug 2021 - Dec 2022

- Used ML models to predict users' perceptual experience on images and videos without the need for reference data, enhancing real-time user experience across various media formats.
- Developed a lightweight, real-time inference pipeline optimized for deployment on user devices, ensuring seamless integration with minimal resource usage.
- Achieved SOTA performance on synthetic datasets and competitive results on authentic datasets, while reducing model size by 54x, significantly improving efficiency and scalability.

## Professional Affiliations

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- Member, ACM Special Interest Group on Knowledge Discovery and Data Mining (SIGKDD)
- Member, Association for Computational Linguistics (ACL)
- Member, IEEE Signal Processing Society

## Academic Services

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### Conference Reviewer / Program Committee

- International Conference on Knowledge Discovery and Data Mining (KDD): 2024, 2025
- ACL Rolling Review (ARR): Feb 2024, Apr 2024, Jun 2024, Aug 2024
- Empirical Methods in Natural Language Processing (EMNLP): 2023
- Asian Conference on Machine Learning (ACML): 2024
- European Conference on Machine Learning (ECML): 2022
- International Conference on Computational Linguistics (COLING): 2024, 2025
- International Conference on Acoustics, Speech, and Signal Processing (ICASSP): 2025

### Journal Reviewer

- IEEE/ACM Transactions on Audio, Speech and Language Processing (T-ASL)
- IEEE Internet of Things Magazine (IoT-M)
- IEEE Journal of Biomedical and Health Informatics (JBHI)
- IEEE Transactions on Artificial Intelligence (TAI)
- IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS)
- IEEE Consumer Electronics Magazine (CEM)
- APSIPA Transactions on Signal and Information Processing