

# Hao FEI



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He is now a research fellow at School of Computing, National University of Singapore, working with [Dr. Tat-Seng Chua](#) and [Dr. Wynne Hsu](#), where he mentors some Ph.D. and M.Sc students in related research of his focus. Also currently he is the associate researcher of Kunlun Skywork AI, working with [Dr. Shuicheng Yan](#). Prior to this, he obtained his Ph.D. degree from Wuhan University, China.



## Employment and Working Experience

- 2022.3–present     **National University of Singapore**  
Leader: [Tat-Seng Chua](#), [Wynne Hsu](#)  
Research Fellow  
Singapore
- 2023.10–present     **Kunlun Skywork AI**  
Leader: [Shuicheng Yan](#)  
Associate Researcher  
Singapore
- 2022.4–2023.9     **Sea AI Lab**  
Leader: [Shuicheng Yan](#)  
Associate Researcher  
Singapore
- 2014.7–2014.9     **Baidu Inc.**  
Intern, Data Mining  
Beijing, China

## Education

- 2018.9–2021.12     **Wuhan University**, Wuhan, China.  
Ph.D. in Computer Science  
*“On the Syntax-oriented Modeling and Optimization of Natural Language”*  
**Excellent Doctoral Thesis Award of Chinese Information Processing Society**  
Thesis advisors: [Donghong Ji](#), [Yue Zhang](#)

## Education (continued)

- 2016.9–2018.6     **Wuhan University**, Wuhan, China.  
M.Sc. in Computer Science  
GPA: 3.7/4.0, Top 6/190
- 2012.9–2016.6     **XiDian University**, Xi'an, China.  
B.Sc. in Computing and Electronic Engineering  
GPA: 3.9/4.0, Top 2/86

## Research Interests

My research directions cover Natural Language Processing (NLP), Multimodal (MM) Machine Learning and Large Language Modeling (LLM), with the specific idea of **Structure-aware Intelligence Learning (SAIL)** that enhances the semantics understanding of varied modalities with the intrinsic data structure modeling.

### ► *Structure-aware NLP*

- **Sentence-level Structural Modeling:** Syntax Parsing, Grammar Induction, Semantic Parsing; Syntax-aided Semantic Role Labeling (SRL) and Information Extraction (IE), e.g., Named Entity Recognition (NER), Relation Extraction and Event Extraction; Structured Sentiment Analysis; Structure-guided Text Generation
- **Dialogue-level Structural Modeling:** Conversation Discourse Structure Parsing; Conversational IE, SRL, Sentiment Analysis, Dialogue Response Generation
- **Document-level Structural Modeling:** Document-level Structural Modeling, Documental Discourse Structure Parsing, Documental IE/SRL, Document Text Generation

### ► *Structure-aware MM*

- **Structure Parsing:** Multimodal Grammar Induction, Text/Visual/Video Scene Graph (SG) parsing
- **Structure-based Multimodal Learning:** Multimodal Sentiment Analysis, IE, Machine Translation, Image/Video Captioning, Cross-lingual Captioning, Text-Image/Video Retrieval, Language-Vision/Video Event Extraction, Structured Dual Learning, Image/Video Synthesis, 3D Generation/Editing

### ► *Structure-aware LLM*

- **Language Modeling:** Structure-aided Language Modeling, KG-enriched Language Modeling, Multimodal Language Modeling, Universal Language Modeling
- **LLM-empowered Machine Learning:** Prompt Learning, Prompt Tuning; In-context Learning, Instruction Tuning; Commonsense Reasoning, Chain-of-thought Reasoning, Cross-modal Reasoning

## Representative Publications

† indicates correspondence, where I lead or mentor the project. \* denotes equal contribution.

### ► *Preprint (Under review)*

1. **Hao Fei**, Shengqiong Wu, Hanwang Zhang, Tat-Seng Chua, Shuicheng Yan. “*VITRON: A Unified Pixel-level Vision LLM for Understanding, Generating, Segmenting, Editing*”. **arXiv**. 2024. (Project)

2. **Hao Fei**, Shengqiong Wu, Wei Ji, Hanwang Zhang, Mong-Li Lee, Wynne Hsu. “*Video-of-Thought: Step-by-Step Video Reasoning from Perception to Cognition*”. **arXiv**. 2024. (Submitted to ICML, scores: 6/7/7/9)
3. Long Qian, Juncheng Li, Yu Wu, Yaobo Ye, **Hao Fei**, Tat-Seng Chua, Yueting Zhuang, Siliang Tang. “*Momentor: Advancing Video Large Language Model with Fine-Grained Temporal Reasoning*”. **arXiv**. 2024. (Submitted to ICML, scores: 5/7/8)
4. Xundong Xu, **Hao Fei**<sup>†</sup>, Liangming Pan, Qian Liu, Mong-Li Lee, and Wynne Hsu. “*Faithful Logical Reasoning via Symbolic Chain-of-Thought*”. **arXiv**. 2024. (Submitted to ACL, scores: 3/3/3.5/4.5)
5. **Hao Fei**, Meishan Zhang, Min Zhang, Tat-Seng Chua. “*XNLP: An Interactive Demonstration System for Universal Structured NLP*”. **arXiv**. 2023. (Demo)
6. Shengqiong Wu, **Hao Fei**<sup>†</sup>, Leigang Qu, Wei Ji, Tat-Seng Chua. “*NExT-GPT: Any-to-Any Multimodal LLM*”. **arXiv**. 2023. (Project | Submitted to ICML, scores: 5/6/7/10)
7. Wei Ji, Li Li, **Hao Fei**<sup>†</sup>, Xiangyan Liu, Xun Yang, Juncheng Li, Roger Zimmermann. “*Towards Complex-query Referring Image Segmentation: A Novel Benchmark*”. **arXiv**. 2023.
8. Yu Zhao, **Hao Fei**<sup>†</sup>, Bobo Li, Meishan Zhang, Jianguo Wei, Min Zhang, Tat-Seng Chua. “*Phylogenetic Language Acquiring: Grammar Induction from Visual, Speech and Text*”. **arXiv**. 2023.

#### ►Peer-reviewed Conference Papers

1. **Hao Fei**, Shengqiong Wu, Wei Ji, Hanwang Zhang, Tat-Seng Chua. “*Dysen-VDM: Empowering Dynamics-aware Text-to-Video Diffusion with LLMs*”. Proceedings of **CVPR**. 2024. (Project)
2. Sijin Chen, Xin Chen, Chi Zhang, Mingsheng Li, Gang Yu, **Hao Fei**, Hongyuan Zhu, Jiayuan Fan, Tao Chen. “*LL3DA: Visual Interactive Instruction Tuning for Omni-3D Understanding, Reasoning, and Planning*”. Proceedings of **CVPR**. 2024. (Project)
3. Zixiang Meng, Qiang Gao, Di Guo, Yunlong Li, Bobo Li, **Hao Fei**, Shengqiong Wu, Fei Li, Chong Teng, Donghong Ji. “*MMLSCU: A Dataset for Multi-modal Multi-domain Live Streaming Comment Understanding*”. Proceedings of **WWW**. 2024.
4. Li Zheng, **Hao Fei**, Fei Li, Bobo Li, Lizi Liao, Donghong Ji, Chong Teng. “*Reverse Multi-Choice Dialogue Commonsense Inference with Graph-of-Thought*”. Proceedings of **AAAI**. 2024.
5. Kangkang Lu, Yanhua Yu, **Hao Fei**, Xuan Li, Zixuan Yang, Zirui Guo, Meiyu Liang, Mengran Yin, Tat-Seng Chua. “*Improving Expressive Power of Spectral Graph Neural Networks with Eigenvalue Correction*”. Proceedings of **AAAI**. 2024.
6. Ao Zhang, **Hao Fei**<sup>†</sup>, Yuan Yao, Wei Ji, Li Li, Zhiyuan Liu, Tat-Seng Chua. “*VPGTrans: Transfer Visual Prompt Generator across LLMs*”. Proceedings of **NeurIPS**. 2023. (Project)
7. Shengqiong Wu, **Hao Fei**<sup>†</sup>, Hanwang Zhang, Tat-Seng Chua. “*Imagine That! Abstract-to-Intricate Text-to-Image Synthesis with Scene Graph Hallucination Diffusion*”. Proceedings of **NeurIPS**. 2023.
8. Leigang Qu, Shengqiong Wu, **Hao Fei**<sup>†</sup>, Liqiang Nie, Tat-Seng Chua. “*LayoutLLM-T2I: Eliciting Layout Guidance from LLM for Text-to-Image Generation*”. Proceedings of **ACM MM**. 2023. (Project)
9. Yu Zhao, **Hao Fei**<sup>†</sup>, Yixin Cao, Bobo Li, Meishan Zhang, Jianguo Wei, Min Zhang, Tat-Seng Chua. “*Constructing Holistic Spatio-Temporal Scene Graph for Video Semantic Role Labeling*”. Proceedings of **ACM MM**. 2023.
10. Wei Ji, Renjie Liang, Lizi Liao, **Hao Fei**<sup>†</sup>, Fuli Feng. “*Partial Annotation-based Video Moment Retrieval via Iterative Learning*”. Proceedings of **ACM MM**. 2023.
11. **Hao Fei**, Qian Liu, Meishan Zhang, Min Zhang, Tat-Seng Chua. “*Scene Graph as Pivoting: Inference-time*

- Image-free Unsupervised Multimodal Machine Translation with Visual Scene Hallucination*". Proceedings of **ACL**. 2023.
12. **Hao Fei**, Bobo Li, Qian Liu, Lidong Bing, Fei Li, Tat-Seng Chua. "Reasoning Implicit Sentiment with Chain-of-Thought Prompting". Proceedings of **ACL**. 2023. ([Project](#))
  13. **Hao Fei**, Meishan Zhang, Min Zhang, Tat-Seng Chua. "Constructing Code-mixed Universal Dependency Forest for Unbiased Cross-lingual Relation Extraction". Proceedings of **ACL** (Findings). 2023.
  14. Shengqiong Wu, **Hao Fei**<sup>†</sup>, Yixin Cao, Lidong Bing, Tat-Seng Chua. "Information Screening whilst Exploiting! Multimodal Relation Extraction with Feature Denoising and Multimodal Topic Modeling". Proceedings of **ACL**. 2023. (**Paper Award nomination, 1.6%**)
  15. Yu Zhao, **Hao Fei**<sup>†</sup>, Wei Ji, Jianguo Wei, Meishan Zhang, Min Zhang, Tat-Seng Chua. "Generating Visual Spatial Description via Holistic 3D Scene Understanding". Proceedings of **ACL**. 2023.
  16. **Hao Fei**, Shengqiong Wu, Jingye Li, Bobo Li, Fei Li, Libo Qin, Meishan Zhang, Min Zhang, Tat-Seng Chua. "LasUIE: Unifying Information Extraction with Latent Adaptive Structure-aware Generative Language Model". Proceedings of **NeurIPS**. 2022. (**Spotlight**)
  17. **Hao Fei**, Shengqiong Wu, Yafeng Ren and Meishan Zhang. "Matching Structure for Dual Learning". Proceedings of **ICML**. 2022.
  18. **Hao Fei**, Fei Li, Chenliang Li, Shengqiong Wu, Jingye Li and Donghong Ji. "Inheriting the Wisdom of Predecessors: A Multiplex Cascade Framework for Unified Aspect-based Sentiment Analysis". Proceedings of **IJCAI**. 2022.
  19. Jingye Li\*, **Hao Fei**\*, Jiang Liu, Shengqiong Wu, Meishan Zhang, Donghong Ji, Fei Li. "Unified Named Entity Recognition as Word-Word Relation Classification". Proceedings of **AAAI**. 2021.
  20. **Hao Fei**, Fei Li, Bobo Li, Yijiang Liu, Yafeng Ren, Donghong Ji. "Rethinking Boundaries: End-To-End Recognition of Discontinuous Mentions with Pointer Networks". Proceedings of **AAAI**. 2021.
  21. **Hao Fei**, Shengqiong Wu, Yafeng Ren, Fei Li and Donghong Ji. "Better Combine Them Together! Integrating Syntactic Constituency and Dependency Representations for Semantic Role Labeling". Proceedings of **ACL** (Findings). 2021.
  22. **Hao Fei**, Meishan Zhang, Donghong Ji. "Cross-Lingual Semantic Role Labeling with High-Quality Translated Training Corpus". Proceedings of **ACL**. 2020.
  23. **Hao Fei**, Yafeng Ren, Donghong Ji. "Retrofitting Structure-aware Transformer Language Model for End Tasks". Proceedings of **EMNLP**. 2020.

#### ►Peer-reviewed Journal Papers

1. **Hao Fei**, Shengqiong Wu, Meishan Zhang, Min Zhang, Shuicheng Yan, Tat-Seng Chua. "Enhancing Video-Language Representations with Structural Spatio-Temporal Alignment". IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPMAI**). 2024.
2. Jiang Liu, **Hao Fei**, Fei Li, Jingye Li, Bobo Li, Liang Zhao, Chong Teng, Donghong Ji. "TKDP: Threefold Knowledge-enriched Deep Prompt Tuning for Few-shot Named Entity Recognition". Transactions on Knowledge and Data Engineering (**TKDE**). 2024.
3. **Hao Fei**, Yafeng Ren, Yue Zhang, Donghong Ji, Xiaohui Liang. "Enriching Contextualized Language Model from Knowledge Graph for Biomedical Information Extraction". Briefings in Bioinformatics (**BiB**). 2021.
4. **Hao Fei**, Yue Zhang, Yafeng Ren, Donghong Ji. "Optimizing Attention for Sequence Modeling via Reinforcement Learning". IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**). 2020.

## Honors and Awards

- 2023
  - World AI Conference (WAIC) Rising Star
  - ACL-2023 Paper Award Nomination
- 2022
  - Excellent Doctoral Thesis Award of Chinese Information Processing Society
  - SIGIR 2022 Travel Award
  - Excellent Graduate Student, Wuhan University
  - Special Prize of Academic Innovation Scholarship (President Award), Wuhan University
  - Luoge Scholarship for Ph.D. Fellowship, Wuhan University
- 2021
  - Outstanding Post-graduate Student Award, Wuhan University
  - 2nd Prize of Academic Innovation Scholarship, Wuhan University
  - Yugang-Songxiao Scholarship, Wuhan University
  - Nomination of Influential Figure Award, Wuhan University
  - 1st Prize of Extraordinary Scholarship of Academy, Wuhan University
  - 1st Prize of Excellent Scholarship of Academy for Ph.D, Wuhan University
- 2020
  - Luoge Scholarship for Ph.D. Fellowship, Wuhan University
  - National Scholarship for Graduate Students, Ministry of Education of China
  - Pacesetter of Outstanding Graduate Student Award, Wuhan University
  - Nomination of Academic Stars of Graduate Student, Wuhan University
- 2016-19
  - 2nd Prize of Academic Scholarship, Wuhan University


## Challenges and Shared Tasks

- 2024
  - 2nd Place in SemEval-2024 Task 3: Multimodal Emotion Cause Analysis in Conversations
- 2019
  - 1st Place in Jing Dong Dialogue Challenge (JDDC) Preliminaries
- 2018
  - 1st Place in the Text Matching Challenge of China Conference on Health Information Processing (CHIP) Text Matching Challenge
- 2017
  - 2nd Prize of National Mathematical Modeling Competition for Graduates, Ministry of Education of China







## Tutorials

- 2024
  - From Multimodal LLM to Human-level AI: Modality, Instruction, Reasoning and Beyond*, CVPR
  - From Multimodal LLM to Human-level AI: Modality, Instruction, Reasoning, Efficiency and Beyond*, LREC-COLING
- 2022
  - Python Introduction and Preliminary for Research*, Wuhan University
- 2020
  - How to AI Research and Paper Writing*, Wuhan University











## Invited Talks

- 2024.1  “From Multimodal LLM to AGI”, Harbin Institute of Technology, Shenzhen
- 2023.12  “From Multimodal LLM to AGI”, CIPS Youth Working Committee in A Star, Singapore
- 2023.8  “LLM-Empowered Text-to-Vision Diffusion Models”, WING Lab @ NUS
-  “Scene Graph-driven Structured Vision-Language Learning”, Chinese Academy of Sciences
- 2023.2  “Towards Human-level AI”, NExT++ Lab @ NUS
- 2022.9  “On the Structure-aware NLP and Beyond”, Jiangnan University
- 2022.8  “Neural Models for End-to-end Complex Information Extraction”, SEA AI Lab
- 2022.6  “On the Structure-aware NLP and Beyond”, NExT++ Lab @ NUS
- 2021.10  “Language Semantic Vs. Syntactic Structure Parsing”, Wuhan University
- 2020.9  “Deep Learning in NLP”, Wuhan University
- 2019.11  “Implicit Objective Network for Emotion Detection”, NLPCC

## Organization of Workshop, Shared Tasks and Special Issues

- 2024  “1st Visual Spatial Description (VSD) Challenge” @ ACM MM
-  “Deep Multimodal Generation and Retrieval”, Special Issue @ ACM Transactions on Multimedia Computing, Communications, and Applications (ToMM)
-  “Nominal Compound Chain Extraction”, Shared Task @ NLPCC
- 2023-2024  “Advances in Large Language Model Empowered Machine Learning: Design and Application”, Special Issue @ Electronics
- 2023  “1st Deep Multimodal Learning for Information Retrieval (MMIR 2023)”, Workshop @ ACM MM
-  “Conversational Aspect-based Sentiment Analysis (DiaASQ)”, Shared Task @ NLPCC

## Open Sources and Projects and Demos

- |   “Universal Structured NLP (XNLP) demonstration system”
- 2.8K ★ |   “NExT-GPT: Any-to-Any Multimodal Large Language Model”
- 695 ★ |   “A General Framework for NLP Sequential Labeling Tasks”
- 476 ★ |   “Unified Named Entity Recognition as Word-Word Relation Classification”
- 260 ★ |   “Transfer Visual Prompt Generator across LLMs. VL-LLaMA, VL-Vicuna”

## Professional Services

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### ► *Conference Organizing Committee*

- **IJCAI 2022**, Session Chair (SNLP track, Virtual)
- **WSDM 2023**, Volunteer Co-Chair
- **NSSDM 2023**, Symposium Chair
- **EMNLP 2023**, Workshop Co-Chair
- **ACL 2023**, Session Chair (Summarization track)
- **SSNLP 2023**, Organizing Committee
- **ACL 2024**, Student Volunteer Co-Chair

### ► *Senior Program Committee Member*

- **EMNLP 2022**, Sentiment Analysis track, (AC)
- **WSDM 2023**, Web Mining and Content Analysis track, (SPC)
- **ARR 2023**, (AE)
- **IJCAI 2023**, Speech & Natural Language Processing track, (SPC)
- **ACL 2023**, Sentiment Analysis track, (AC)
- **EMNLP 2023**, Information Extraction track, (SAC)
- **AAAI 2024**, Speech & Natural Language Processing + Computer Vision track, (SPC)
- **LREC-COLING 2024**, Lexicon and Semantics track, (SAC)
- **IJCAI 2024**, Speech & Natural Language Processing + Computer Vision track, (SPC)
- **NAACL 2024**, (AC/ARR-AE)
- **EACL 2024**, (AC/ARR-AE)
- **ACM MM 2024**, (AC)
- **ICML 2024**, (AC)
- **ACL 2024**, (AC/ARR-AE)
- **CCL 2024**, (AC)
- **NLPCC 2024**, Sentiment Analysis track, (AC)

### ► *Program Committee Member*

- **ACL**: 2019, 2020, 2021, 2022
- **ARR**: 2021, 2022, 2023
- **ICML**: 2021, 2022, 2023
- **ICLR**: 2020, 2021, 2022, 2023
- **ICLR (AGI Workshop)**: 2024
- **NeurIPS (Data and Benchmark Track)**: 2023, 2024
- **AAAI**: 2019, 2020, 2021, 2022, 2023
- **IJCAI**: 2019, 2020, 2021, 2022
- **SIGIR**: 2023, 2024
- **EMNLP**: 2018, 2019, 2020, 2021, 2022
- **COLING**: 2018, 2020, 2022
- **WWW**: 2023, 2024

- **AACL:** 2020, 2021, 2022, 2023
- **NLPCC:** 2019, 2020, 2021, 2022, 2022
- **CCL:** 2019, 2020, 2021, 2022, 2023
- **CVPR:** 2024
- **COLM:** 2024
- **CIKM:** 2024

#### ► *Journal Editorial*

- **Associate Editor:** ACM TALLIP
- **Associate Editor:** Neurocomputing
- **Guest Editor:** ACM ToMM
- **Guest Editor:** Electronics

#### ► *Journal Reviewer*

- IEEE TPAMI
- IEEE TMM
- IEEE TCSVT
- IEEE TKDE
- ACM TOIS
- IEEE TNNLS
- IEEE TASLP
- IEEE TAFEC
- ACM TALLIP
- ACM Computing Surveys
- Information Processing & Management
- Neurocomputing
- Information Fusion
- Information Sciences
- Knowledge-based System
- BMC Bioinformatics
- Neural Computing and Applications
- Expert Systems With Applications
- Engineering Applications of Artificial Intelligence
- World Wide Web
- ...



## Referees

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1. **Dr. Tat-seng Chua**

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2. **Dr. Shuicheng Yan**

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3. **Dr. Wynne Hsu**

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4. **Dr. Hanwang Zhang**

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