SHIJIE LI

+86 17269595927 | sjli22@m.fudan.edu.cn | Shanghai
Ph.D student wiil graduate in June 2026

EDUCATION

Fudan University Sep 2022 - Jun 2026

Ph.D in Artificial Intelligence, College of Computer Science and Artificial Intelligence, Shanghai

Fudan University Sep 2019 - Jun 2022

M.Sc in Biochemistry and Molecular Biology, School of Life Science, Shanghai

Nanjing Forestry University Sep 2015 - Jun 2019

B.S in Biological Science, College of Life Science, Nanjing

RESEARCH EXPERIENCE

Research on MASH Pathological Diagnosis Algorithms and Multimodal Analysis Jan 2021 - Present

(Metabolic-Associated Steatohepatitis, MASH)

- **Project Overview:** Developed an AI-driven diagnostic and analysis framework for MASH, integrating large-scale multimodal clinical data from multiple tertiary (3A) hospitals. The project constructed an end-to-end clinical decision support and research platform by jointly analyzing histopathological Whole Slide Images (WSIs), ultrasound and MRI-PDFF imaging, and routine blood biomarkers from thousands of patients. Core objectives included pathological grading, quantitative feature extraction, non-invasive biomarker discovery, and robust multi-center generalization.
- **Responsibilities and Contributions:**
  - Led end-to-end development as the core and sole doctoral researcher, from data curation and framework design to model implementation and validation.
  - Designed whole-slide image analysis pipelines based on multi-instance learning for weakly supervised MASH pathological grading and lesion characterization.
  - Developed quantitative pathological feature representations linking histopathology with clinically interpretable biomarkers. Analyzed non-invasive–gold standard correlations between pathology, imaging (MRI-PDFF), and blood-based indices for disease assessment.
  - Implemented multi-center domain adaptation and fine-tuning strategies to improve model robustness and generalization across hospitals.

RAG-based Multimodal Pathology Multi-Instance Learning for Medical Diagnosis May 2025 - Aug 2025

- **Project Overview :** Proposed a knowledge-guided multimodal multi-instance learning framework for pathological diagnosis, addressing limitations of conventional MIL methods in ignoring clinical guidelines and exhibiting poor ordinal consistency. By integrating retrieval-augmented generation (RAG) and text-guided representation learning, the method aligns textual clinical knowledge with visual pathology features to enable ordinal-aware weakly supervised classification. The approach achieved state-of-the-art performance on a WSI dataset of 740 liver biopsy cases.
- **Responsibilities and Contributions**
  - Co-led the core methodological design of a RAG-enhanced, text-guided multimodal MIL framework for pathology analysis.
  - Constructed domain-specific medical knowledge bases and text prototypes to incorporate guideline-driven supervision into visual learning.
  - Designed dual-branch text–visual fusion architectures to achieve semantic alignment and ordinal-aware weak supervision.
  - Led dataset preprocessing, experimental design, and comprehensive baseline comparisons on large-scale WSI cohorts.
  - Contributed to manuscript preparation and supported the translation of algorithmic advances toward clinical validation.

Reasoning-aware Medical Lesion Segmentation Based on Large Language Models Jan 2025 - May 2025

- **Project Overview :** Defined a novel lesion reasoning segmentation task to address limitations of conventional segmentation models in handling implicit, clinically motivated queries. Constructed a large-scale benchmark dataset covering multiple imaging modalities and reasoning styles, and proposed Lesion-R1, a unified framework that integrates LLM-based reasoning with segmentation decoders. The model aligns textual reasoning and pixel-level predictions via a two-stage training strategy combining supervised fine-tuning and reward-based alignment.
- **Responsibilities and Contributions :**

- **Responsibilities and Contributions :**
  - Led task formulation and benchmark construction, building a multi-modal medical lesion dataset (10k images) with diverse reasoning styles.
  - Designed the Lesion-R1 architecture, integrating LLM reasoning modules with segmentation decoders for query-driven lesion localization.
  - Implemented a two-stage training pipeline (SFT + reward-based alignment), aligning reasoning and segmentation outputs using IoU-based rewards.
  - Conducted model training, evaluation, and ablation studies to validate reasoning-guided segmentation performance.

Semi-supervised Segmentation of Ultra-High-Resolution Images with Foundation Models Jan 2024 - Jul 2024

- **Project Overview:** Addressed the challenge of limited annotations in ultra-high-resolution image segmentation by proposing a visual-prompt-based semi-supervised framework built upon the Segment Anything Model (SAM). The method introduces retrieval-style segmentation via class-aware multi-variant visual prompts, combined with prompt perturbation consistency regularization, extending the applicability of foundation vision models to semi-supervised settings.
- Responsibilities and Contributions:
  - Proposed a visual prompt learning–based semi-supervised segmentation framework for ultra-high-resolution images using SAM.
  - Designed a retrieval-style segmentation paradigm with class-aware, multi-variant visual prompts to enhance label efficiency.
  - Introduced prompt perturbation consistency regularization to stabilize semi-supervised training under limited annotations.
  - Collected and curated multiple open-source semi-supervised segmentation benchmarks, and led end-to-end experimentation and evaluation.
  - Led the project as first author, completing algorithm design, experiments, and manuscript preparation.

Computer-Aided Diagnosis of Whole-Slide Pathology Images Jan 2023 - Jan 2024

- **Project Overview:** Investigated key challenges in whole-slide image (WSI) pathology analysis, focusing on multi-scale heterogeneity and computational efficiency under ultra-long sequence modeling. Proposed hierarchical and pyramid-based multi-scale fusion strategies to enhance representation learning, and developed redundancy-aware diagnostic schemes to reduce computational overhead while preserving diagnostic performance.
- **Responsibilities and Contributions**
  - Proposed hierarchical sampling contrastive learning to capture multi-scale pathological representations, systematically comparing multiple self-supervised learning strategies.
  - Designed a pyramid multi-scale feature fusion framework to integrate heterogeneous contextual information across resolutions.
  - Developed an explicit de-redundancy diagnosis scheme, filtering diagnostically relevant image patches to significantly reduce token-level computation.
  - Led the project as first author, independently completing method design, algorithm implementation, experimental validation, and result analysis.

PUBLICATIONS

[1] SSR-SAM:Retrieval Segment Anything Model for UHR Image Segmentation. **AAAI 2026, First author**

[2] WSI Redundancy Reduction for Efficient Pathological Diagnosis. **Biomedical Signal Procession and Control, First author**

[3] CLCC1 Governs ER Bilayer Equilibration to Maintain Lipid Homeostasis. **Nature, Co-author**

[4] AceMIL: Ordinal-Aware Multiple Instance Learning for Pathological Analysis **(Under Review) CVPR 2026, First author**

[5] Integrated Enhancement of Cross Scale Fusion for WSI Classification. **(Under Review) Pattern Recognition, First author**

[6] Knowledge-guided Multi-modal MIL for MASH Scoring. **(Under Review) IEEE Transactions on Big Data, First author**

[7] LeSeg-R1: Lesion Reasoning Segmentation for Universal Medical Images **(Under Review) ICME 2026, second author**

[8] Cross-center Accurate Pathological Scoring of MASH with AI. **In prepare, First author**

[9] **Invention Patent:** Apparatus and method for detecting and quantifying hepatic lobule inflammation from liver pathological section images. **Authorized,** (CN116563206B), Third Completed Person

[10] **Invention Patent:** A fat content analysis device and method for liver pathological section images. **Authorized,** (CN116245850B), Third Completed Person