Xiaoqi Zhao 赵骁骐

NTU AI4X Principal Investigator / Postdoctoral Fellow

NRF Postdoctoral Award · NTU AI-for-X Postdoctoral Fellowship

Founding Partner · X3000 INSPECTION (Startup, Series B Funded)

Contact

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🎓 Google Scholar

 github.com/Xiaoqi-Zhao-DLUT

Last updated: March 2026

My long-term research vision is to build a general-purpose visual intelligence engine under the AI-for-X paradigm. This vision is structured around three interconnected layers: **Pattern, Unification, AI4X Applications.** At the pattern level, I investigate self-driven learning mechanisms such as self-supervised, open-vocabulary, prompt-based, and in-context learning to establish scalable and transferable learning principles that reduce supervision dependency and enhance generalization. At the unification level, I study how diverse visual tasks, concepts, and modalities can be integrated within shared architectures and representations, enabling unified multi-task modeling, context-dependent concept understanding, and image-video multi-modal perception under a coherent semantic framework. Built upon these foundations, the AI4X application layer extends the engine into real-world domains such as healthcare and industry, validating its robustness in complex, domain-specific environments while **continuously expanding the scope of X**. Ultimately, progressing toward visual AGI requires iterative strengthening of learning patterns, deeper unification across tasks and modalities, and sustained expansion of AI4X domains to achieve multi-source input processing, multi-task learning, multi-modal fusion, cross-domain generalization, and a balance between expert-level performance and unified modeling.

Education, Entrepreneurship & Professional Experience

Nanyang Technological University (NTU) — Singapore

AI4X Principal Investigator / Postdoctoral Fellow (Mar. 2026 –)
 NRF Postdoctoral Award (PI, SGD $250,000) · NTU AI-for-X Postdoctoral Fellowship

Yale University · Radiology & Biomedical Imaging — New Haven, USA

Postdoctoral Researcher (Feb. 2025 – Mar. 2026)
 With Prof. Xiaofeng Liu & Prof. Georges El Fakhri (AIMBE & IEEE Fellow)

X3000 INSPECTION (Startup, Series B Funded) — Beijing, China

Founding Partner & Equity Stake Holder (Jan. 2025 –)

X3000 INSPECTION (Startup, Series B Funded) — Beijing, China

Founding Partner & Chief AI Scientist (Sep. 2021 – Oct. 2024)
 Led X3000Former / X3000NeXt foundational models; serving CATL, Geely, Chery, CALB, EVE Energy

Dalian University of Technology (DUT, Project 985) — Liaoning, China

Ph.D. Signal and Information Processing, IIAU-Lab (Sep. 2019 – Oct. 2024)
 Advisors: Prof. Lihe Zhang & Prof. Huchuan Lu (IEEE Fellow)

Dalian University of Technology (DUT, Project 985) — Liaoning, China

B.E. Electronic Information Engineering (Sep. 2015 – Jun. 2019)

Research Interests

[01] Unified Visual Perception
- General Concept Understanding
- Context-Dependent Multi-Concept Understanding
- Unified Multi-modal / Image-Video / Multi-view Models

[02] Self-driven Learning
- Self-supervised / Unsupervised Learning
- Few-shot / In-context / Prompt Learning
- Open-Vocabulary Learning
- Foundation Model Evaluation & Adaptation

[03] AI4Industry
- Battery Management System
- Power Battery Detection & Generation with Ultra-dense Plates (600+ plates)
- High-speed Industrial CT Reconstruction
- Unsupervised Anomaly Detection
- Industrial Blind Image Enhancement

[04] AI4Health
- Medical Diagnosis with Incomplete Modalities
- PET-CT-MRI Fusion
- Medical Generalist Models

Honors and Awards

2026   **Singapore NRF Postdoctoral Award (PI)** — Top-tier Singapore Government Fellowship; SGD $250,000; up to 4-year support toward Assistant Professorship

2026   **NTU AI-for-X Postdoctoral Fellowship**

2025   **World Artificial Intelligence Conference (WAIC) Yunfan Award — Rising Star Nomination** (10 winners worldwide)

2025   Profiled by *People's Daily* 《人民日报》 as Outstanding PhD Student Representative (100 nationwide; 1 from DUT)

2020–24   **AI 2000 Most Influential Scholars** by AMiner in Computer Vision (5 consecutive years)

2022, 24   **National PhD Scholarship** ($\times$2), Ministry of Education in China

2023   **Gold Award** · 8th China International "Internet+" Innovation & Entrepreneurship Competition, Company/Project: X3000 INSPECTION (工源三仟) ($\approx$0.05‰; 161 / 3,400,000+ teams)

2023   **3rd Place** · CVPR 2023 PVUW Challenge, Video Semantic Segmentation Track

2022   **CVPR Outstanding Reviewer** ($\approx$2%; 156 / 6,247)

2022   **Huawei Camera Academic Rising Star Award** (8 winners worldwide; 170,000+ live viewers; ¥30,000 bonus)

2022   **MICCAI Challenge: Glaucoma Oct Analysis and Layer Segmentation (GOALS)** · Team: IIAU-Segmentors · Glaucoma Detection 1st/100 · OCT Segmentation 3rd/100 · Overall 2nd/100 ($1,300)

2020   Huawei Fellowship

2018   **3rd Place** · **OPPO Top AI Competition** (Portrait Segmentation; 3 / 456; ¥50,000 bonus)

# Publications   Google Scholar: 4,000+ citations   · ⋆: equal contribution   · #: corresponding author
(Scopus ID: 57219626008. Public code available for all my first/co-first/last/corresponding author works.)

TPAMI / IJCV / TIP	7
NeurIPS / ICML / CVPR / ECCV / ICCV / AAAI / MM	20 (3 oral, 1 highlight)
Papers with 1,000+ Citations	1
Papers with 500+ Citations	3
Papers with 100+ Citations	10
Papers as First / co-First / Last / Corresponding Author	23

Preprints

Inspiring the Next Generation of Segment Anything Models: Comprehensively Evaluate SAM and SAM 2 with Diverse Prompts Towards Context-Dependent Concepts under Different Scenes

[32] **Xiaoqi Zhao**, Youwei Pang, Shijie Chang, Yuan Zhao, Lihe Zhang, Chenyang Yu, Hanqi Liu, Jiaming Zuo, Jinsong Ouyang, Weisi Lin, Georges El Fakhri, Huchuan Lu, Xiaofeng Liu

arXiv 2025   [arXiv] [Code]   13 citations

Power Battery Detection

[31] **Xiaoqi Zhao**, Peiqian Cao, Chenyang Yu, Zonglei Feng, Lihe Zhang, Hanqi Liu, Jiaming Zuo, Youwei Pang, Jinsong Ouyang, Weisi Lin, Georges El Fakhri, Huchuan Lu, Xiaofeng Liu

arXiv 2025   [arXiv] [Code]   1 citations

SAM3-I: Segment Anything with Instructions

[30] Jingjing Li, Yue Feng, Yuchen Guo, Jincai Huang, Yongri Piao, Qi Bi, Miao Zhang, **Xiaoqi Zhao**, Qiang Chen, Shihao Zou, Wei Ji, Huchuan Lu, Li Cheng

arXiv 2025   [arXiv] [Code]   2 citations

Journals

ComPtr: Towards Diverse Bi-source Dense Prediction Tasks via a General Complementary Transformer

[29] Youwei Pang, **Xiaoqi Zhao**, Lihe Zhang, Huchuan Lu

IEEE TPAMI 2025   [arXiv] [Code]   12 citations

Beyond Mask: Rethinking Guidance Types in Few-shot Segmentation

[28] Shijie Chang, Youwei Pang, **Xiaoqi Zhao**, Huchuan Lu, Lihe Zhang

Pattern Recognition 2025   [arXiv] [Code]   7 citations

Towards Diverse Binary Segmentation via A Simple yet General Gated Network

[27] **Xiaoqi Zhao**, Youwei Pang, Lihe Zhang, Huchuan Lu, Lei Zhang

IJCV 2024   [arXiv] [Code]   33 citations

Adaptive Multi-source Predictor for Zero-shot Video Object Segmentation

[26] **Xiaoqi Zhao⋆**, Shijie Chang⋆, Youwei Pang, Jiaxing Yang, Lihe Zhang, Huchuan Lu

IJCV 2024   [arXiv] [Code]   17 citations

ZoomNeXt: A Unified Collaborative Pyramid Network for Camouflaged Object Detection

[25] Youwei Pang⋆, **Xiaoqi Zhao⋆**, Tian-Zhu Xiang, Lihe Zhang, Huchuan Lu

IEEE TPAMI 2024   [arXiv] [Code]   121 citations

CAVER: Cross-Modal View-Mixed Transformer for Bi-Modal Salient Object Detection

[24] Youwei Pang, **Xiaoqi Zhao**, Lihe Zhang, Huchuan Lu

IEEE TIP 2023   [arXiv] [Code]   **ESI Highly Cited · Top 1%**   218 citations

Joint Learning of Salient Object Detection, Depth Estimation and Contour Extraction

[23] **Xiaoqi Zhao**, Youwei Pang, Lihe Zhang, Huchuan Lu

IEEE TIP 2022   [arXiv] [Code]   42 citations

Conferences

UniMMAD: Unified Multi-Modal and Multi-Class Anomaly Detection via MoE-Driven Feature Decompression

[22] Yuan Zhao⋆, Youwei Pang⋆, Lihe Zhang#, Hanqi Liu, Jiaming Zuo⋆, Huchuan Lu, **Xiaoqi Zhao#**

CVPR 2026   [arXiv] [Code]   1 citations

TP-Seg: Task-Prototype Framework for Unified Medical Lesion Segmentation

[21] Jiawei Xu, Qiangqiang Zhou#, Dandan Zhu, Yong Chen, Yugen Yi, **Xiaoqi Zhao#**

CVPR 2026   [Code]

U-Harmony: Enhancing Joint Training for Segmentation Models with Universal Harmonization

[20] Weiwei Ma, Xiaobing Yu, Peijie Qiu, Jin Yang, Pan Xiao, **Xiaoqi Zhao**, Xiaofeng Liu, Tomo Miyazaki, Shinichiro Omachi, Yongsong Huang

ISBI 2026 [arXiv] **Oral**

UniMRSeg: Unified Modality-Relax Segmentation via Hierarchical Self-Supervised Compensation

[19] **Xiaoqi Zhao**, Youwei Pang, Chenyang Yu, Lihe Zhang, Huchuan Lu, Shijian Lu, Georges El Fakhri, Xiaofeng Liu

NeurIPS 2025 [arXiv] [Code] 2 citations

Rethinking Evaluation of Infrared Small Target Detection

[18] Youwei Pang, **Xiaoqi Zhao**[#], Lihe Zhang, Huchuan Lu, Georges El Fakhri, Xiaofeng Liu, Shijian Lu

NeurIPS 2025 [Paper] [Code] 1 citations

Unified Medical Lesion Segmentation via Self-referring Indicator

[17] Shijie Chang, **Xiaoqi Zhao**, Lihe Zhang, Tiancheng Wang

CVPR 2025 [Paper] [Code] 1 citations

Mixture-of-Shape-Experts (MoSE): Shape Dictionary Framework to Prompt SAM for Medical Segmentation

[16] Jia Wei, **Xiaoqi Zhao**, Jonghye Woo, Jinsong Ouyang, Georges El Fakhri, Qingyu Chen, Xiaofeng Liu

CVPR Workshops 2025 [Paper] 5 citations

Spider: A Unified Framework for Context-dependent Concept Segmentation

[15] **Xiaoqi Zhao***, Youwei Pang*, Wei Ji*, Baicheng Sheng, Lihe Zhang, Jiaming Zuo, Huchuan Lu

ICML 2024 [arXiv] [Code] 24 citations

Towards Automatic Power Battery Detection: New Challenge, Benchmark Dataset and Baseline

[14] **Xiaoqi Zhao***, Youwei Pang*, Zhenyu Chen, Qian Yu, Lihe Zhang, Hanqi Liu, Jiaming Zuo, Huchuan Lu

CVPR 2024 [arXiv] [Code] 8 citations

Multi-view Aggregation Network for Dichotomous Image Segmentation

[13] Qian Yu*, **Xiaoqi Zhao***, Youwei Pang*, Lihe Zhang, Huchuan Lu

CVPR 2024 [arXiv] [Code] **Highlight ≈3% [324 / 11,532]** 40 citations

Open-Vocabulary Camouflaged Object Segmentation

[12] Youwei Pang*, **Xiaoqi Zhao***, Jiaming Zuo, Lihe Zhang, Huchuan Lu

ECCV 2024   [arXiv] [Code]   25 citations

Isomer: Isomerous Transformer for Zero-shot Video Object Segmentation

[11] Yichen Yuan, Yifan Wang, Lijun Wang, **Xiaoqi Zhao**, Huchuan Lu, et al.

ICCV 2023   [arXiv] [Code]   28 citations

Zoom In and Out: A Mixed-scale Triplet Network for Camouflaged Object Detection

[10] Youwei Pang*, **Xiaoqi Zhao***, Tian-zhu Xiang, Lihe Zhang, Huchuan Lu

CVPR 2022   [arXiv] [Code]   574 citations

Self-Supervised Pretraining for RGB-D Salient Object Detection

[9] **Xiaoqi Zhao**, Youwei Pang, Lihe Zhang, Huchuan Lu, Xiang Ruan

AAAI 2022   [arXiv] [Code]   **Poster ≈15% [1,349 / 9,020]**   112 citations

Multi-Source Fusion and Automatic Predictor Selection for Zero-Shot Video Object Segmentation

[8] **Xiaoqi Zhao**, Youwei Pang, Jiaxing Yang, Lihe Zhang, Huchuan Lu

ACM MM 2021   [arXiv] [Code]   **Oral ≈9%**   52 citations

Automatic Polyp Segmentation via Multi-scale Subtraction Network

[7] **Xiaoqi Zhao**, Lihe Zhang, Huchuan Lu

MICCAI 2021   [arXiv] [Code]   **Top 1% Cited · Ranking #2 in Colonoscopy @ MICCAI 2021**   443 citations

Suppress and Balance: A Simple Gated Network for Salient Object Detection

[6] **Xiaoqi Zhao***, Youwei Pang*, Lihe Zhang, Huchuan Lu, Lei Zhang

ECCV 2020   [arXiv] [Code]   **Oral ≈2%**   **Top 3% Cited · Ranking #1 in Visual Saliency @ ECCV 2020**   661 citations

A Single Stream Network for Robust and Real-time RGB-D Salient Object Detection

[5] **Xiaoqi Zhao**, Youwei Pang, Lihe Zhang, Huchuan Lu, Lei Zhang

ECCV 2020   [arXiv] [Code]   321 citations

Multi-scale Interactive Network for Salient Object Detection

[4] Youwei Pang⋆, **Xiaoqi Zhao**⋆, Lihe Zhang, Huchuan Lu

CVPR 2020 [arXiv] [Code] **Top 4% Cited · Ranking #1 in Visual Saliency @ CVPR 2020** 1,056 citations

Hierarchical Dynamic Filtering Network for RGB-D Salient Object Detection

[3] Youwei Pang, Lihe Zhang, **Xiaoqi Zhao**, Huchuan Lu

ECCV 2020 [arXiv] [Code] 305 citations

M^{2}SNet: Multi-scale in Multi-scale Subtraction Network for Medical Image Segmentation

[2] **Xiaoqi Zhao**, Hongpeng Jia, Youwei Pang, Long Lv, Feng Tian, Lihe Zhang, Weibing Sun, Huchuan Lu

[arXiv] [Code] **2nd Place / 100 · MICCAI 2022 GOALS Challenge** 190 citations

3rd Place Solution for PVUW2023 VSS Track: A Large Model for Semantic Segmentation on VSPW

[1] Shijie Chang, Zeqi Hao, Ben Kang, **Xiaoqi Zhao**, et al., Huchuan Lu

[arXiv] [Code] **3rd Place · CVPR 2023 PVUW Challenge**

Participated Grants / Projects

Singapore National Research Foundation (NRF) Postdoctoral Award Grant Mar. 2026 – Mar. 2030

Principal Investigator (PI) · SGD $250,000

Singapore's most prestigious postdoctoral funding, awarded by the National Research Foundation under the Prime Minister's Office. Open to applicants worldwide; the fellowship supports only a handful of outstanding researchers each year and is explicitly structured as a pathway toward an independent faculty/research position in Singapore. Comes with full autonomy over research direction and lab establishment budget.

NTU AI-for-X (AI4X) Postdoctoral Fellowship Grant Mar. 2026 – Mar. 2030

Principal Investigator (PI) · Nanyang Technological University

Awarded by NTU, supporting the AI4X initiative to advance general-purpose AI across scientific and engineering disciplines.

X3000Former Series — Industrial Vision Foundation Models Industry Project 2021.06 – 2024.12

Chief Scientist · X3000 INSPECTION (Startup, Series B Funded) · Clients: CATL, Ganfeng Lithium, EVE Energy

• **Unified Industrial Imaging & Inspection System for Top Power Battery Companies:** Fast High-resolution CT Reconstruction · Unified Visual-Language Model · Fine-grained Image Generation

• **Power Battery Inspection & Enhancement for Top Power Battery Companies:** Tiny Object Detection · Overhang Measurement · Image Blind Enhancement

• **Automation of Production Systems for Top Automobile OEMs:** OCR · Internal Defect Detection

National Natural Science Foundation of China (NSFC) Key Projects   Grant   2019.12 − 2024.12

Principal Doctoral Student · Dalian University of Technology

- **Multi-modal Cross-domain Anomaly Detection for Complex Industrial Scenarios:** Responsible for unified model design and self-supervised pretraining
- **Unified Representation of Cross-Media Data and Knowledge:** Responsible for design of high-performance semantic segmentation methods
- **Saliency Detection with Progressive Prediction and Deep Embedding:** Responsible for exploring lightness of RGB-D saliency detection models

Professional Services and Talks

Program Committee / Reviewer

- · ACL 2026
- · CVPR 2022–2026 **(Outstanding Reviewer ≈2%)**
- · ICCV 2021–2025
- · ECCV 2022–2024
- · AAAI 2022–2026
- · NeurIPS 2023–2025
- · ICLR 2024–2026
- · ICML 2024–2026

Journal Reviewer & Guest Editor

- · IEEE TPAMI
- · International Journal of Computer Vision (IJCV)
- · IEEE Transactions on Image Processing (TIP)
- · IEEE Transactions on Medical Imaging (TMI)
- · IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- · IEEE Transactions on Multimedia (TMM)
- · Guest Editor · J. Imaging Special Issue

Well-recognized Open-source Projects / Toolkits / Awesomes
GitHub Followers: 360+ · Total Stars: 2,500+

(All my accepted papers as First/co-First/Last/Corresponding author have their code released on GitHub.)

Awesome-AI4X-NSCLR-Papers   ★ 136
AI+X papers in Nature / Science / Cell / Lancet / Radiology

Awesome-Open-Vision-Problem-Modeling   ★ 140
Awesome List for Diverse Open Vision Problems and Modeling Solutions

Awesome-Unified-Context-dependent-Concept-Segmentation   ★ 119
Awesome List for Unified Context-dependent Concept Segmentation

SAMs-CDConcepts-Eval   ★ 575
Comprehensive Evaluation of SAM & SAM 2 with Diverse Prompts

PySegMetrics   ★ 123
Python Evaluation Toolbox for Segmentation Tasks

Spider-UniCDSeg   ★ 351
(ICML 2024) Unified Framework for Context-dependent Concept Segmentation

MSNet-M2SNet   ★ 441
(MICCAI 2021 & 2022 GOALS) Multi-scale Subtraction Network

X-ray-PBD   ★ 310
(CVPR 2024) Power Battery Detection Benchmark

GateNet-RGB-Saliency   ★ 263
(IJCV 2024 & ECCV 2020 Oral) Diverse Binary Segmentation

UniMRSeg   ★ 174
(NeurIPS 2025) Unified Modality-Relax Segmentation