Jingwei Zhang

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Google Scholar

EDUCATION

Stony Brook University Stony Brook, NY, USA
Ph.D. Candidate in Computer Science *2018.09 - now*
- Research interests: computer vision, efficient models, Mamba, GPU algorithms, multi-modal models, self supervised learning (SSL), parameter efficient fine tuning (PEFT)
- Advisor: Prof. Dimitris Samaras
- GPA: 4.00/4.00

Institute of Computing Technology, Chinese Academy of Sciences Beijing, China
M.S. in Computer Science *2015.09 - 2018.06*
- Research interests: algorithms in bioinformatics, statistics
- Advisor: Prof. Shiwei Sun and Prof. Dongbo Bu
- Major GPA: 3.89 / 4.00, Overall GPA: 3.73 / 4.00

Shandong University Shandong, China
B.E. in Computer Science and Technology *2010.09 - 2015.06*
- Major GPA: 3.94 / 4.00, Overall GPA: 3.81 / 4.00

EXPERIENCE

Insitro South San Francisco, CA, USA
Data Science and Machine Learning Intern *2025.06 - now*
- Working on a self-supervised training with image and Gene functions (text).
- Addressing the missing channel problems in images.

MAJOR RESEARCH PROJECTS

LBMamba: Locally Bi-directional Mamba 2024.12-2025.05
- Proposed a Mamba architecture that employs a locally bi-directional scanning mechanism and its hardware-aware (thread-level bi-direction) selective scan CUDA operator. It has 27% more FLOPS than the vanilla Mamba but only 2% slower.
- Together with a sequence reserving operation, our model only need one scan operations every layer, achieving much better accuracy-throughput trade-off than the baseline methods.

2DMamba: Efficient State Space Model for Image Representation 2024.06-2024.11
- Proposed a 2D selective State Space Model architecture which directly scans a 2D image without first flattening it into a 1D sequence, which results in a loss of spatial correlation in 2D.
- Proposed a novel hardware-aware 2D selective scan CUDA operator with a special designed caching mechanism that extends the 1D Mamba parallelism into 2D.
- Demonstrated the effectiveness of our method over SOTA methods on both pathology classification/survival tasks and natural image classification/segmentation tasks.

A Segment Anything Model for Semantic Segmentation in Digital Pathology 2023.05-2023.8
- Proposed SAM-Path, which adapted the Segment Anything Model (SAM) for semantic segmentation in pathology by introducing trainable class prompts, enabling SAM for semantic segmentation tasks.
- Further improved SAM's applicability to pathology tasks by incorporating a pathology encoder, specifically a pathology foundation model.
- Demonstrated the effectiveness of SAM-Path in conducting semantic segmentation in digital pathology without the need for human input prompts through extensive experiments on public pathology datasets.

Boosting Multi-Instance Learning Schemes via Task-specific Prompt Tuning 2023.01-2023.3
- Proposed Prompt-MIL, a novel multi-instance learning (MIL) framework for whole slide image (WSI) classification in computational pathology.

- Introduced a prompt tuning mechanism for MIL that fine-tunes a small fraction of parameters to inject task-specific knowledge into self supervised features, bridging the performance gap between fully task-tuned and task-agnostic features.
- Conducted extensive experiments on three WSI datasets, demonstrating Prompt-MIL's superior accuracy over conventional MIL methods. Compared to traditional full fine-tuning approaches, our method is more accurate, fast and GPU memory saving.

Precise Location Matching Improves Dense Contrastive Learning 2022.09-2022.12

- Proposed a precise location-based matching mechanism to boost contrastive learning for dense prediction tasks in digital pathology.
- Leveraged overlapping information between geometric transformations to precisely match regions in two augmentations.
- Experiments on two pretraining datasets and three downstream datasets showed superiority of proposed method in semantic and instance segmentation tasks.

Gigapixel Whole-Slide Images Classification Using Locally Supervised Learning 2021.09-2022.3

- Proposed a locally supervised learning framework for classifying whole slide images (WSIs) that optimizes a network by dividing it into modules and leveraging some auxiliary models for local optimization.
- Introduced a novel Random Feature Reconstruction unit (RFR) to enhance the preservation of distinguishing features during training, improving the performance by 1% to 3%.
- Achieved significant computational efficiency by being 7 to 10 times faster than conventional methods, and the method required only 20% of the total GPU memory compared to end-to-end training approaches.

MAJOR PUBLICATIONS

[1] **J. Zhang**, X. Han, H. Qin, M. Hosseini and D. Samaras, "LBMamba: Locally Bi-directional Mamba," (Submitted to TMLR, under review)

[2] X. Han, **J. Zhang**, X. Han, D. Samaras, F. Hou and H. Qin, "GeoMaNO: Geometric Mamba Neural Operator for Partial Differential Equations," (co-first author, submitted to NeurIPS 2025)

[3] **J. Zhang**, T. Nguyen, X. Han, V. Trinh, H. Qin, D. Samaras and M. Hosseini, "2DMamba: Efficient State Space Model for Image Representation with Applications on Giga-Pixel Whole Slide Image Classification," *CVPR*, 2025, 3583-3592.

[4] S. Kapse, S. Das, **J. Zhang**, R. Gupta, J. Saltz, D. Samaras and P. Prasanna, "Attention De-sparsification Matters: Inducing diversity in digital pathology representation learning," *Medical Image Analysis*, 2024

[5] **J. Zhang**, S. Kapse, K. Ma, P. Prasanna, J. Saltz, M. Vakalopoulou, and D. Samaras, "Prompt-MIL: Boosting Multi-instance Learning Schemes via Task-Specific Prompt Tuning," *MICCAI*, 2023, 624-634. (**Oral**)

[6] **J. Zhang**, K. Ma, S. Kapse, J. Saltz, M. Vakalopoulou, P. Prasanna and D. Samaras, "SAM-Path: A Segment Anything Model for Semantic Segmentation in Digital Pathology," *MICCAI Workshops*, 2023, 161-170. (**Oral**)

[7] **J. Zhang**, S. Kapse, K. Ma, P. Prasanna, M. Vakalopoulou, J. Saltz, and D. Samaras, "Precise Location Matching Improves Dense Contrastive Learning in Digital Pathology," *IPMI*, 2023, 783-794.

[8] **J. Zhang**, X. Zhang, K. Ma, R. Gupta, J. Saltz, M. Vakalopoulou and D. Samaras, "Gigapixel Whole-Slide Images Classification Using Locally Supervised Learning," *MICCAI*, 2022, 192-201. (**Oral**)

[9] **J. Zhang**, K. Ma, V John, R. Gupta, J. Saltz, M. Vakalopoulou and D. Samaras, "A Joint Spatial and Magnification Based Attention Framework for Large Scale Histopathology Classification," *CVPR Workshops*, 2021, 3776-3784. (Best paper award)

AWARDS & SCHOLARSHIPS

- Best Paper Award, in CVMI 2021 at CVPR 2021 June, 2021
- Best Poster Award, in CCF Bioinformatics Conference 2016 Nov, 2016
- Bronze Medal of the 2011 ACM-ICPC Asia Regional Contest Nov, 2011

SKILLS

Python, Pytorch, Java, C/C++, MATLAB, MySQL