Shengxiang Sun

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EDUCATION

University of Toronto *Sep 2022 – (expected) Aug 2026*

Honours Bachelors of Science in Computer Science

- **GPA: 3.82/4.00**

RESEARCH EXPERIENCE

- **Visiting Research Assistant, University of Utah** *May 2025 – Present*
  Topics: Long-Horizon Furniture Assembly by Learning from RGB Videos Advisor: **Prof. Weiyu Liu**
- **Visiting Research Assistant, National University of Singapore** *Oct 2024 – Sept 2025*
  Topic: IKEA Manual Learning with VLMs for Robotic Assembly Advisor: **Prof. Lin Shao**
- **Undergraduate Research Assistant, University of Toronto** *May 2024 – Aug 2024*
  Topic: VLA Failure Detection, Point-Cloud Forecasting Advisor: **Prof. Florian Shkurti**

PUBLICATIONS

* indicates equal contribution

1 [**ICRA 2026 (In Submission)**] C. Tie*, **S. Sun***, Y. Lin, Y. Wang, Z. Li, Z. Zhong, J. Zhu, Y. Pang, H. Chen, J. Chen, R. Wu, L. Shao, "Manual2Skill++: Connector-Aware General Robotic Assembly from Instruction Manuals via Vision–Language Models"

2 [**NeurIPS 2025**] Q. Gu, Y. Ju, **S. Sun**, I. Gilitschenski, H. Nishimura, M. Itkina, F. Shkurti, "SAFE: Multitask Failure Estimation for Vision-Language-Action Models" **[Paper]** **[Website]**

3 [**RSS 2025**] C. Tie*, **S. Sun***, J. Zhu, Y. Liu, J. Guo, Y. Hu, H. Chen, J. Chen, R. Wu, L. Shao, "Manual2Skill: Learning to Read Manuals and Acquire Robotic Skills for Furniture Assembly Using Vision-Language Models" **[Paper]** **[Website]**

RESEARCH PROJECTS

Long-Horizon Furniture Assembly by Learning from RGB Videos (Ongoing)
Advisor: Prof. Weiyu Liu, Assistant Professor, Utah, CS *Aug 2025 – Present*

- Working on training a Diffusion Policy for assembly tasks, which relies exclusively on video understanding
- Created a dataset of long-horizon furniture assembly using FurnitureBench and IsaacGym

Manual2Skill++: Connector-Aware General Robotic Assembly from Instruction Manuals via Vision–Language Models
Advisor: Prof. Lin Shao, Assistant Professor, NUS, CS *Apr 2025 – Sept 2025*

- Developed a novel dataset representing connector placements (e.g., screws, nails) for assembly objects, converting abstract manual illustrations into a unified hierarchical graph representation for connector-aware assembly
- Proposed a VLM pipeline for automatic extraction of connector placements and graph generation from manuals

Improving Point-Cloud Forecasting Accuracy, CS Project Course
Advisor: Prof. Florian Shkurti, Assistant Professor, UofT, CS *May 2025 – Aug 2025*

- Designed an end-to-end model fusing multi-view RGB images with past point clouds to enhance future forecasting
- Investigated CNN, Transformer, and Diffusion-based architectures for point-cloud forecasting

SAFE: Multitask Failure Estimation for Vision-Language-Action Models
Advisor: Prof. Florian Shkurti, Assistant Professor, UofT, CS *May 2024 – May 2025*

- Performed ablation studies on input representations (raw images vs. VLA's final layer embeddings) for training and evaluating the failure estimation module
- Developed a pipeline using PyTorch and SimplerEnv to fine-tune VLAs on mixed datasets from OXE

Manual2Skill: Learning to Read Manuals and Acquire Robotic Skills for Furniture Assembly Using Vision-Language Model
Advisor: Prof. Lin Shao, Assistant Professor, NUS, CS *Nov 2024 – Feb 2025*

- Employed VLMs to generate high-level furniture assembly plans from IKEA manuals, achieving generalization across diverse furniture types and exceeding previous baselines by over 300%.
- Generated 10,000+ furniture parts via a novel, automated Blender pipeline to simulate realistic assembly scenes

RESEARCH INTERESTS

My research spans **Robotics** and **3D Vision** to enable **generalizable robot manipulation**. I aim to develop systems that execute complex, long-horizon tasks from simple instructions (e.g., "prepare a dish from this cookbook") by learning from existing human knowledge with foundation models, rather than collecting data from scratch.

SCHOLARSHIPS & AWARDS

- **2022-2025 General In-Course Scholarship** (For maintaining a GPA of at least 3.7/4.0) (CAD 12,000)
- **2023-2025 Dean List Scholar**
- **2024 Summer NSERC Math & Computer Science Research Award** (CAD 8,000)
- **2024 First Place, GenAI Genesis (Canada's Largest AI Hackathon) – Best Safety & Security AI (InterView Team)**

WORK EXPERIENCE

Loblaw Digital **Toronto (CA)**
Machine Learning Engineer Co-op - Generative AI Team *Jan 2024 – Apr 2024*

- Enhanced an automated email reply system using Google's Gemini Pro, Python, Docker, CI/CD, Few-Shot and Chain-of-Thought prompt engineering, which resulted in over 3400 correctly automated email replies per week.
- Developed an end-to-end machine learning pipeline for enhanced shopping experience, with OpenAI's GPT-4 Vision, Python, Pandas, SQL, Apache Airflow DAGs, and Google Cloud Platform, which automatically generated product descriptions for 154,286 products sold at Loblaws, Shoppers Drug Mart, and Joe Fresh

New H3C Technologies **Beijing (CN)**
Machine Learning Research Intern *Jul 2023 – Aug 2023*

- Designed training & testing pipelines of Llama2, Dreambooth, InstructPix2Pix on MobaXterm and WebUI, by using PyTorch and HuggingFace, which doubled the team's testing data outputs
- Enabled automated downloads of Python dependencies with bash scripting, reducing installation steps by 40%

PROGRAMMING SKILLS & LANGUAGE SKILLS

Proficient Python, LaTeX, HTML **Familiar** PyTorch, Linux, C, Java, Git

Chinese (Native), English (Fluent), French (Intermediate)