

# Chen Bao

✉ [baochen@sjtu.edu.cn](mailto:baochen@sjtu.edu.cn)  [chenbao.tech](https://chenbao.tech)  [Kami-code](#)

## EDUCATION

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School of Software, Shanghai Jiao Tong University

Sep 2019 – Jun 2023 (Expected)


B.S. in Software Engineering,

Overall GPA 3.82/4.3, Top 15% | Last 1.5 Years GPA 4.03/4.3, 3<sup>rd</sup> in 96

Relevant Coursework	Intro to Computer Systems (95)	Computer Systems Engineering (95)
Software Engineering Practices (95)	Machine Learning (95)	Advanced Data Structures (95)

## PUBLICATIONS & MANUSCRIPTS

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**DexArt: Benchmarking Generalizable Dexterous Manipulation with Articulated Objects** 

Chen Bao\*, Helin Xu\*, Yuzhe Qin, Xiaolong Wang

Accepted by *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023

**Robotube: Learning Household Manipulation from Human Videos with Simulated Twin Environments** 

Haoyu Xiong\*, Haoyuan Fu\*, Jieyi Zhang, Chen Bao, Qiang Zhang, Yongxi Huang, Wenqiang Xu, Animesh Garg, Cewu Lu

Accepted by *Conference on Robot Learning (CoRL)*, 2022 (**Oral Presentation**, 6.5%)

## RESEARCH EXPERIENCE

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MVIG Lab, Department of Computer Science, Shanghai Jiao Tong University

Oct 2020 – Mar 2022

Research Assistant, advised by Prof. Cewu Lu

### Storm: An Self-supervised Affordance Learning

- **Innovation:** Proposed STORM, a framework to learn screw representations for tool manipulation with the data collected from the simulated interactions, which represents the affordance of tools in a screwable manner with more semantic information; achieved the goal without cumbersome human labeling or over-simplified action space; modeled each task with its correlated reward functions and sampled self-supervised data from simulations.

### Robotube: Learning Household Manipulation from Human Videos with Twin Environments



- **Innovation:** Proposed RoboTube video dataset, a human video dataset containing 5,000 videos demonstrations recorded with multi-view RGB-D cameras of humans performing everyday household tasks such as the manipulation of rigid objects, articulated objects, deformable object, and bimanual manipulation; suggested the use of RT-sim, simulated twin environments which consist of 3D scanned, photo-realistic objects, minimizing the visual domain gap between the physical world and the simulated environment; ensured that models learned from RoboTube video dataset could be evaluated in the paired simulation environments (RT-sim) smoothly.
- **Outcome:** Extensive experimental results suggested that RoboTube can serve as a benchmark that guides the future development of robot learning.

Department of Electrical and Computer Engineering, University of California, San Diego

Mar 2022 – Mar 2023

Research Assistant, advised by Prof. Xiaolong Wang

### DexArt: Benchmarking Generalizable Dexterous Manipulation with Articulated Objects



- **Innovation:** Proposed a new benchmark for Dexterous manipulation with Articulated objects (DexArt) in a physical simulator; evaluated the generalizability of the learned policy on unseen articulated objects; achieved such generalization using Reinforcement Learning (RL) with 3D representation learning.
- **Outcome:** Performed extensive studies on RL with 3D point cloud inputs and provided new insights on how 3D representation learning affects decision making.

## INDEPENDENT PROJECTS

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**Tiger Compiler: A Compiler implemented in C++** 

Shanghai, China

Open Source Contributor

Sep 2021 – Jan 2022

- **Innovation:** Implemented a lexical scanner using flexc++ and a parser using Bisonc++; designed a type-checking phase for parsers; allocated registers for each program based on the available registers on different machines.
- **Outcome:** The compiler successfully generate working code that runs on x86-64 platform; passed all unit test points.

## ChCore OS: A Microkernel Operation System implemented in C++ and Assembly

Shanghai, China

Open Source Contributor

Sep 2021 – Jan 2022

- **Innovation:** Designed page table structure to manage physical and virtual memory. Implemented the exception handling pipeline to support kernel processes and user processes; supported multi-kernel and multi-process scheduling; developed the virtual file system and the user shell.
- **Outcome:** The ChCore OS passed all the unit test points; received a 99 in SE3357(Operation System) projects.

## Mini-k8s: A Mini Container Orchestration Framework for Multi-host Environment

Shanghai, China

Team Leader, Co-creator with a Team of 3

Feb 2022 – June 2022

- **Innovation:** Assigned the IP of each pod by Flannel and etcd; connected the worker node and metadata node with the Flask server; implemented the abstraction of pod, replicaset, service, auto-scaling and serverless.
- **Outcome:** Minik8s can manage the diverse containers which fulfill the CRI (Container Runtime Interface) requirement in different physical machines, and support period management, auto scaling and other basic functions; integrated the serverless platform based on minik8s; received a score 98 (Top 10%) in SE3356 (Cloud Operating System Design and Practice).

## Oasis 2200: A Popular Game made in Unity3D

Shanghai, China

Team leader, Co-creator with a Team of 4

June 2021 – Sep 2021

- **Innovation:** Developed an online multiplayer game using Unity3D; designed a frame synchronization schema using SpringBoot, which can synchronize combat data across players; designed and built a websocket-based cluster architecture which is resilient and robust to support high concurrency.
- **Outcome:** Game is available in the Taptap game center and has over 9K+ downloads and 15K+ followers.

## HONORS & AWARDS

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First Prize (Top 4)	The 19 <sup>th</sup> National University Robot Competition Robomaster (2020)
Second Prize (Shanghai)	China Undergraduate Mathematical Contest in Modeling (2020)
Second Prize	National Olympiad in Informatics in Provinces (2017)
Excellent Undergrad Scholarship	Shanghai Jiao Tong University (2020, 2021, 2022)

## SKILLS

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<b>Tools and Programming Languages</b>	C++ (Proficient)	Python (Proficient)	C# (Proficient)
	Java (Skilled)	LATEX (Skilled)	Shell (Skilled)
	Javascript (Skilled)	Assembly (Skilled)	
<b>Framework</b>	<b>Machine Learning</b>	Pytorch (Proficient)	
	<b>Tools</b>	Docker & Kubernetes (Skilled)	
	<b>Simulation</b>	Sapien (Proficient)	Unity (Proficient)
		Pybullet (Proficient)	ROS (Skilled)
<b>Fundamental Knowledge</b>	Algorithm	Operating System	Robotics
<b>Languages</b>	Mandarin (Native)	English (TOEFL iBT: 105)	Japanese (JLPT N2)