# JINGHAN KE

jinghan@mail.ustc.edu.cn Jinghan Ke ah-miu.github.io

## EDUCATION

**B.A. in Computer Sciences**, University of Science and Technology of China (USTC) July, 2024 (expected)

## PUBLICATIONS

1. Chengkai Hou, Zhengrong Xue, Bingyang Zhou, **Jinghan Ke**, Lin Shao, Huazhe Xu.*Key-Grid: Unsupervised 3D Keypoints Detection using Grid Heatmap Features.* Under Review: submitted to CVPR 2024.
2. Qinsi Wang* , **Jinghan Ke***, Zhi Liang.*MathNAS: If Blocks Have a Role in Mathematical Architecture Design.* Neural Information Processing Systems (NeurIPS 2023).
3. Xinghao Zhu, **Jinghan Ke**, Zhixuan Xu, Zhixin Sun, Bizhe Bai, Jun Lv, Qingtao Liu, Yuwei Zeng, Qi Ye, Cewu Lu, Masayoshi Tomizuka and Lin Shao. *Diff-LfD: Contact-aware Model-based Learning from Visual Demonstration for Robotic Manipulation via Differentiable Physics-based Simulation and Rendering.* Conference on Robot Learning (CoRL 2023). Oral Presentation(6.6%).

## SELECTED RESEARCH EXPERIENCE

**Human Dressing** *#Robotics #Diff-sim* Aug. - Sep. 2023 & Dec. 2023 - present
*Advisor: Prof. Lin Shao [NUS AP] , Prof. Harold Soh [NUS AP] , Dr. Wenqiang Xu[MIT Postdoc]* *NUS, Singapore*

- Aim to build a real-time, random-pose, robotic dressing system that can wear shirts, pants, and shoes.

**Accelerating Neural Architecture Search** *#AutoML #Large Model Design #Edge Devices* Apr. - May., 2023
*Co-author: Qinsi Wang [USTC RA]* *USTC, China*

- Analyzed nearly a hundred top-tier conference papers on NAS to shape MathNAS thesis's core narrative and logic without mentorship or editorial guidance.
- Developed the concept of network potential energy, drawing from physics and social influence, to explain observed inverse proportionality in experiments.
- Engaged in discussions with collaborator and reviewers, refining experiments and theory, and providing insights highlighting our work's innovation.
- Enhanced research impact by releasing open-source code and designing a poster (a quick overview), gaining 30 stars on GitHub in a month.

**Model-based Learning from Demonstration** *#Robotics #CG #Diff-sim #Model-based* Dec. 2022 - May., 2023
*Advisor: Prof. Lin Shao [NUS AP]* *USTC, China*

- Developed a gradient approximation technique for robotic manipulation using vector relations in a physics-based simulator, proving project feasibility.
- Pioneered an algorithm leveraging instance segmentation (preceding 'segment anything') and action detection to specific segment sequences and masks from sth-sth videos.
- Developed 'diff-mesh,' a self-supervised algorithm using Pyredner for differentiable rendering, to reconstruct and extract object shapes and trajectories from monocular RGB videos. Exceeds capabilities of CVPR 2023 NeRF SOTA.

## SELECTED PROJECTS

**WowKiddy** *Project Leader* *Coursework of Operating Systems(Honors).* [Code] Mar. – Jul. 2o22
A distributed dataset platform for shared images and videos.Evaluated as Outstanding and Highly Innovative.

- Constructed the distributed file system based on a distributed system framework: JuiceFS.
- Converted videos to CSS Sprites(combinations of multiple frames) for web preview.
- Applied a graph database: Neo4j to connect files based on their meta information and tags.
- Utilized system monitoring frameworks: Prometheus and Grafana for system monitoring.

## SELECTED WORKING EXPERIENCE

**Software Engineer and Marketing Manager**, *Guizhou Millennium Longevity Biotech Co., Ltd.* Sep. – Nov., 2021
At a socially impactful poverty-alleviation enterprise, my key contributions were:

- Authored a global market report affirming our product's market-leading quality, influencing national industry standards.
- Promoted products at exhibitions, securing attention and fostering significant investment and research partnerships.
- Negotiated a reduction in testing fees by over 50% and engaged in early-stage negotiations for a business deal exceeding RMB 100 million.
- Initiated a logistics tracking platform, product WeChat mini-program, and a feedback analysis crawler.

## RESEARCH SKILLS

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|---|---|
| **Low-Level Programming and System Development** | C/C++(STL) , Rust , GO , Verilog |
| **High-Level Scripting and Database** | Python(Pytorch) , MATLAB , MySQL |
| **Debugging and Profiling Tools** | GDB |
| **System, Code Management, and Containerization** | Bash , CMake , Git , Docker |
| **Web Development and Frontend Technologies** | HTML/CSS/JavaScript , Flask |
| **Text Editing and Documentation** | Markdown , LaTeX , Vim |
| **Blockchain Technologies** | Fabric |
| **Modeling and Rendering** | Pyredner , MitSuba3 , MeshLab , Blender , Houdini , Fusion 360 , SOLIDWORKS |
| **Rigid and Cloth Simulator** | Nimble/Jade , Pybullet , DiffCloth/DiffClothAi |

## SELECTED HONORS

2020 - 2023 **Outstanding Student Scholarship** University of Science and Technology of China

## INTERESTS

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|---|---|---|
| **Travel** | *50+ cities, 10+ museums, 5+ renowned mountains.* | 2021 - 2023, China |
| **Cycling** | *Cycled around the island, self-guided, solo, 945.1 km.* | Jul. 27 - Aug. 4, 2021, Hainan, China |
| **Hiking** | *Completed 42+ km of scientific expedition training.* | Oct. 1 - 3, 2019, Longjing River, Anhui, China |

**Obsessions:**

- Groove involving kinesthetic, visual, and auditory elements.
- Transmission and reception of experiential wisdom: wandering across a thousand miles, delving into a thousand tomes, and crossing paths with innumerable hearts...

**Research Interests:**

- Aging user experience and service system design, particularly utilizing robotics.
- Robots designed for automated movie and music video filming.
- Robotics in virtual reality and virtual reality in robotics.