

# Chang Yu

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**Research Interest:** Physically-based Simulation, High-Performance Computing, Numerical Optimization

## EDUCATION

### University of Electronic Science and Technology of China

Bachelor of Engineering in Software Engineering, Elite Program

Chengdu, China  
Aug 2019 - Jul 2023 (Expected)

**GPA:** 3.99/4.0 **Average score:** 92.24 **Rank:** 1/57

**Honors and Awards:** Outstanding Undergraduate Scholarship (2019-2022), Provincial Honor Graduate

### GAMES: Graphics And Mixed Environment Symposium

Online

**Completed Courses:** (GAMES 201) Advanced Physics Engines, (GAMES 102) Geometric Modeling and Processing, (GAMES 202) Real-Time High Quality Rendering

## PUBLICATIONS

- **Chang Yu\***, Yi Xu\* (\* joint first authors), Ye Kuang, Yuanming Hu, Tiantian Liu, MeshTaichi: A Compiler for Efficient Mesh-based Operations, *ACM Transactions on Graphics [Proceedings of SIGGRAPH Asia]*, 2022.
- Yilong Wu\*, **Chang Yu\*** (\* joint first authors), Real-time Physics Engine Based on MPM & PBD, **2020 International Conference on Virtual Reality and Visualization (ICVRV)**.

## EXPERIENCE

### Simulation & Research Team, Taichi Graphics

Beijing, China

Research & Development Intern, Supervisor: *Tiantian Liu*

Mar 2021 - Present

- **Research, development and deployment of MeshTaichi extension:** A research program. Developed and deployed a novel mesh compiler based on Taichi that provides an intuitive programming model for efficient mesh-based operations. Devised the programming interface and backend code generation. Implemented XPBD, Projective Dynamics, and Lagrangian-force MPM for experiments. Submitted a patent. Work published in SIGGRAPH Asia 2022.
- **Development of prototype of Taichi's Vulkan GPU backend:** Developed and deployed an IR builder to convert CHI IR (Taichi's intermediate representation) to SPIR-V, which could be executed by Vulkan SDK, as a solution for non-CUDA environment and AOT compilation. Technical talks presented on [TaichiCon01/02](#).
- **Teaching:** Teaching Assistant of [Taichi Graphics Course S1 \(in Chinese\)](#), Fall 2021

## SELECTED PROJECTS

- **Taichi Power-PIC:** Taichi Implementation of Power Particle-in-Cell transfer scheme extended upon a hybrid Eulerian-Lagrangian fluid solver. [\[Repo\]](#)
- **Implicit MPM:** Implemented an implicit material point method solver with a fixed-corotated elastic model in Taichi Lang, using the Newton-Raphson method and matrix-free preconditioned conjugate gradient method to solve non-linear equations. [\[Repo\]](#)
- **SWMPM:** Implemented an explicit material point method simulator for simulating porous sand and water mixtures using APIC and MLS-MPM transfer schemes. GAMES 201 final project. [\[Repo\]](#)
- **AyaRay:** Designed and developed a multi-threading CPU ray-tracing renderer equipped with hand-writing SIMD optimization. Included many algorithms in light transport simulation and appearance modeling. [\[Repo\]](#)
- **Taichi Ferrofluid:** Implemented an Euler fluid solver in Taichi Lang to simulate magnetic substance based on multigrid preconditioned conjugate gradient Poisson solver and level-set method. [\[Repo\]](#)

## SKILLS

- **Programming Languages:** C/C++(OpenGL, Vulkan), CUDA, Python(Tensorflow), **Taichi** **Technologies:** Git, LaTeX, Ssh, CMake, Houdini
- **Languages:** TOEFL 104 (Speaking: 23, Writing: 25), GRE General 329 (Verbal: 161, Quant: 168, AWA: 3.5), Chinese (Native)