Yu Zhang 张宇

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Education

Beijing Normal University

M.E. in Computer Science and Application *2017 - 2020*

- Advisor: Zhongke Wu

Beijing Normal University

B.S. in Computer Science and Technology *2013 - 2017*

Work Experience

(* The listed projects are only a selected part of all the projects during each period)

2024.10-Now **Research Assistant** University of Utah (Prof. Yin Yang's lab), Salt Lake City

- **Genesis** (Role: Project participant, work with Prof. Chuang Gan)
  - A generative and simulated physical realm for general-purpose embodied-AI learning.
  - Optimizing the physical simulation library and assisting with the first release.
- **High performance Cloth Solver** (Role: Project owner)
  - Implementing the Baraff-Witkon cloth model based on a variational (optimization) formulation.
  - Achieves a high-performance cloth solver (30k DoFs ~30FPS) based on the Newton's method.
  - Utilizing the IPC (Incremental Potential Contact) algorithm to handle the collision between the cloth and the rigid body.
- **Gaussian Splatting Reconstruction** (Role: Project participant)
  - Optimize the performance of a differentiable renderer's GPU forward propagation code (CUDA kernels).
  - Achieved 3 times performance improvement of loss-related calculation via the separable kernels algorithm.

2021-2024 **Graphics R&D Engineer** Taichi Graphics, Beijing

- **Meshy 3D AIGC Project** (Role: Project participant)
  - Optimizing the generateion quality and performance of the 3D generative model.
  - Investigating various differentiable geometric representations.
- **Soft2D Physics Engine** (Role: Project owner)
  - This is the world's first 2D MPM multi-material continuum physics engine for real-time applications.
  - See Soft2D website (docs.soft2d.tech) for more details.
- **High-Performance PBD Engine** (Role: Project owner)
  - A position-based dynamics physics engine similar to Houdini Vellum.
  - Supports a series of materials: rigid body, soft body, fluid, cloth, granular material, etc.
  - Achieves a 60 FPS's 240k particles fluid simulation, which can also be extended to a large-scale (10 million particles) scene.
  - Implements algorithms like dual contouring for fluid surface construction and the CCD (Continuous collision detection) algorithm for collision detection.

2020-2021 **Game Engine Engineer** Tencent Games, Shenzhen

- **Unreal Engine SPH Plugin** (Role: Project owner)
  - Simulates real-time SPH (smoothed-particle hydrodynamics) linear elasticity deformable objects and fluids in the UE (Unreal Engine) game engine.
  - We are the first people to implement the 3x3 SVD algorithm (Aleka McAdams's version) in HLSL (high-level shader language).
- **Unity Stable Fluids Plugin** (Role: Project owner)

- Achieves a real-time stable fluids simulation in the Unity game engine.
- The plugin is optimized specifically for mobile devices and is able to run at 2ms per frame performance on a mid-range mobile phone.

2019.07-09 **Game Engine Engineer (Intern)** NetEase Games, Guangzhou

- **Real-Time Fluid Simulation in Games** (Advisor: Xiaosheng Li)
  - Achieves two popular Lagrangian methods - SPH (Smooth Particles Hydrodynamics) and PBF (Position Based Fluids), on both PC and mobile platforms.
  - Implements two fluid surface rendering methods: Marching Cubes and SSFR (Screen Space Fluid Rendering).
  - This application is implemented in Unity compute shader and is able to run on cell phones in real-time.

Publications

3DGS^2: Near Second-order Converging 3D Gaussian Splatting. Arxiv 2025
Lei Lan, Tianjia Shao, Zixuan Lu, **Yu Zhang**, Chenfanfu Jiang, Yin Yang

Dynamic Ball B-Spline Curves. CGI 2023
Ciyang Zhou, **Yu Zhang**, Zhoneke Wu, Xingce Wang

Dynamic Disk B-Spline Curves. CASA 2020 && CAVW
Yu Zhang, Zhoneke Wu, Xingce Wang

Awards & Honors

2017 **The 2017 ACM-ICPC, Gold Medal**, Xi'an. (Top 10% teams)
2016 **China Collegiate Programming Contest, Gold Medal**, Hefei. (Top 10% teams)
The 2016 ACM-ICPC, Gold Medal, Qingdao. (Top 10% teams)
2015 **The National Scholarship**, Beijing Normal University. (5 winners among 500+ participants)
Undergraduate National Innovation Project, Beijing Normal University. (Grant ¥20,000)
China Collegiate Programming Contest, Gold Medal, Nanyang. (Top 10% teams)
2014 **The First Prize Scholarship**, Beijing Normal University. (Selected 4 out of 40+)
2013 **The First Prize Scholarship**, Beijing Normal University. (Selected 4 out of 40+)

Language & Skills

TOEFL **97** (Reading 29, Listening 26, Speaking 19, Writing 23)
SKILLS C++, Python, Unreal/Unity Engine, Blender, Houdini, Mathematica, etc.