# Zhenyuan Zhang

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## Education

**University of Michigan** **Ann Arbor**
*Master of Science in Computer Science* *Sep. 2021 – May 2023*
**Core courses**: Parallel Computing, Category Theory, Motion Robotics

**University of Michigan** **Ann Arbor**
*Bachelor of Science in Computer Science, GPA 3.8 out of 4.0* *Sep. 2019 – May 2021*
**Core courses**: Computer Architecture, Data Structures and Algorithms, Operating Systems, Compiler Construction, Game Development, Robotics Kinematics and Dynamics

**University of Michigan – Shanghai Jiao Tong University Joint Institute** **Shanghai**
*Bachelor of Science in Electronic and Computer Engineering, GPA 3.6 out of 4.0* *Sep. 2017 – Aug. 2021*
**Core courses**: Engineering Probabilistic Methods, Differential Equations, Linear Algebra, Discrete Mathmetics

## Experience

**Voxel Cone Tracing Global Illumination**
*Programmer* *Jan. 2022 - Feb. 2022*
An extension for the bevy game engine which implements global illumination using voxel cone tracing
- Built with WebGPU, a modern GPU rendering and computing API
- Developed pipelines for voxelizing the scene, generating mipmaps and tracing the voxel data
- Published as a 3rd-party plugin to `crates.io`

**Parallel $A^*$ Search on GPU**
*Designer and Programmer* *Dec. 2021 - Jan. 2022*
A research project on paralleling $A^*$ searching algorithm on a GPU
- Implemented heap, hashtable and memory pool on GPUs in `CUDA` and `C++`
- Got an approximately 10x speedup on Quadro RTX 4000 than the single-threaded version on i7 8700

**Procedural Animation Project**
*Leader* *Jan. 2021 – Apr. 2021*
A research project seeks to introduce methods of motion synthesis in robotics into animation systems
- Wrote a differentiable physics simulation with hard contacts
- Generated the physically-correct trajectory for characters offline
- Applied to real-time game-like applications using motion matching and IK

**Undergraduate Game Development**
*Designer and Programmer* *Oct. 2020 – Dec. 2020*
A game project done by a team of four in one semester with `Unity Engine`
- Designed core mechanism focused on planning and executing
- Designed the code architecture based on event channels (pub-sub design pattern)
- Implemented enemy AI with complex but reasonable behavior using `Goal Oriented Action Planning`

**Research in ARM Lab on Trap Aware Model Predictive Control**
*Student Researcher* *May 2020 – Feb. 2021*
An online model-based controller for escaping traps in novel environments
- Implemented baseline based on `Guided Policy Search` in `Python`
- Implemented baseline based on `Soft Actor-Critic` in `Python`

## Skills

**Programming Languages**:
- `C++`: Have good coding style; Have experience in multiple projects
- `Rust`: Understand ownership, lifetime and traits; Have project experience

**Game Engines**: `Unity`, `Bevy` (Written in `Rust`)

**Others**: `Git`, `Jira`, `Blender`