# Zimu Guan

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## Education

**University of Illinois at Urbana-Champaign** Urbana, IL
*B.S. in Computer Engineering, GPA: 3.96/4.0* *Aug. 2018 – May. 2022*

- Deans' List, 2019, 2020, 2021

**Zhejiang University** Hangzhou, China
*B.E. in Electronics and Computer Engineering, GPA: 3.97/4.0* *Aug. 2018 – May. 2022*

- Zhejiang University, Third-class scholarship, 2018, 2019, 2020
- ZJUI Institute, Second-class scholarship, 2019, 2021
- ZJUI Institute, Third-class scholarship, 2020

## Research Experience

**Cut-and-Paste Neural Rendering** Aug. 2021 – Dec. 2021
*Research Intern, Advisor: David Forsyth* *University of Illinois at Urbana-Champaign*

- Create and annotate benchmark data set and evaluate the performance of the cut-and-paste neural renderer.

**All-hexahedral Mesh Refinement with Flexible Density Control** Apr. 2021 – Aug. 2021
*Research Intern, Advisor: Jin Huang* *State Key Lab of CAD & CG, Zhejiang University*

- Build an adaptive all-hexahedral mesh refinement pipeline aiming to improve physically based simulation especially finite element method. Solve the limitation of uneven density control of previous methods
- The pipeline can refine the target mesh according to a given reference density field using several refine methods including selective padding method and element-by-element method. After that, the pipeline can evaluate the result refined mesh then output vtk files for visualization.

**Virtual Reality in Robot Assisted Surgical Training** Jun. 2019 – Aug. 2019
*Research Intern, Advisor: Liangjing Yang* *ZJU-UIUC Institute*

- Based on the robot assisted surgical, explore precise way on virtual reality training, camera calibration and 3D reconstruction.
- Won the Second Prize of Excellent Summer Intern Project, awarded by ZJUI institute

## Selected Projects

**TLEOS(Unix based Operating System)** | *C,ASM(x86)* - [CODE] Apr. 2021

- *Course Project for ECE 391 Computer Systems Engineering*
- Developed a Linux-like operating system kernel that supports almost all basic functionalities of a modern OS, including interrupt, system call, virtual memory, scheduling and a read-only file-system.
- Supported a range of devices such as keyboard, mouse, sound card, serial port, RTC, PIT, network card and VGA.
- Developed some basic graphics functionality including high-resolution image display.
- Supported music playing.

**FPGA-Based 3D Graphics Renderer** | *SystemVerilog* - [CODE] Dec. 2020

- *Final Project for ECE 385 Digital System Laboratory*
- Designed and implemented a basic graphics pipeline on FPGA that renders 3D objects through model, view, projection transformation and Rasterization, including all control & data flow.
- Achieved real-time rendering and interactive interface with the position of the camera and the rotation of the object in control. Supported viewport clipping and .obj model file loading.
- Improved rendering performance with frame buffer and parallel hardware design to achieve smooth and stable frame rates.
- Won the Best Design Award in the course project competition.

**Index Structure Database with Stack-based Query Processing** | *Python3* - [CODE] May. 2020

- *Computing Assignment for CS225 Data Structure*
- Implemented a list-of-block structure as bottom layer that simulates real memory
- Built B+-tree and B-tree for both primary keys and secondary keys indexing to improve querying speed.
- Designed and implemented a two-stack abstract machine to process queries semantically in a flexible way.

## Teaching Experience

**MATH 241 Calculus III** Sept. 2020 – Jan. 2021

*Teaching Assistant, Instructor: Thomas Honold* *ZJU-UIUC Institute*

- Hold discussion sessions every week and taught difficult concepts covered in course including lebesgue integral, manifold, differential forms, etc. for engineering students. These sessions are famous among students, attracting other sessions' students to join in.

## Extracurricular Activities

**Design Event Posters** Sept. 2019 – Aug. 2020

*Creative Design Department Member* *New Media Center, International Campus, Zhejiang University*

- Core member of creative design department. Always gave the overall framework of the poster design. Posters are used in graduation ceremony, activity propoganda, etc.

**Aid Education in Remote Mountains of China** Aug. 2019

*Volunteer Teacher* *Jiaoma Center School, Jiaoma, Qiannan, Guizhou, China*

- 2 weeks volunteer teaching in the local primary school. Taught arts & English and loved by students. Visited students' family deep in the mountains and local government staffs to investigate local education and poverty relief condition.

## Skills

**Programming Languages**: C/C++, Python3, x86-asm, MATLAB, SystemVerilog(FPGA), Shell
**Tools**: CUDA, OpenGL, CMake, LaTeX, Markdown, Git, Docker