# Danhua Zhang

PhD Student, Mixed Reality and HCI

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## Education

**University of Minnesota Twin Cities**, MN, USA *Sep. 2019 - Jun. 2025 (expected)*
*Doctor of Philosophy in Computer Science, College of Science and Engineering*
**University of Minnesota Twin Cities**, MN, USA *Sep. 2017 - Nov. 2020*
*Master of Science in Computer Science, College of Science and Engineering*
**Sun Yat-sen University**, Guangzhou, China *Aug. 2013 - June 2017*
*Bachelor of Science in Information and Computing Science, School of Mathematics*

## Publications

**Danhua Zhang**, Malik Khadar, Brett W Schumacher, Madhava Raveendra, Sam Adeniyi, Fei Wu, Sahar Aseeri, and Evan Suma Rosenberg. "COVID-Vision: A Virtual Reality Experience to Encourage Mindfulness of Social Distancing in Public Spaces." *In 2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW). IEEE.* DOI:10.1109/VRW52623.2021.00231

Yuxuan Huang, **Danhua Zhang**, and Evan Suma Rosenberg. "DBA: Direction-Based Authentication in Virtual Reality" *In 2023 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW). IEEE.* DOI:10.1109/VRW58643.2023.00319

## Technical Skills

**Programming Languages**: C/C++, C#, Processing, R script
**Programming Software**: MS Visual Studio, Matlab, R Studio
**Libraries**: OpenGL, OpenVR, VRPN, Photon PUN 2
**Game Engine**: Unity, Unreal Engine
**3D Modeling**: Character Creator 3, iClone 7, Maya, Blender
**Digital Art**: PaintTool SAI, Davinci Resolve, Adobe PhotoShop, After Effects, Premier

## Research Experience

**Knee Surgery: 3D Data Visualization** *June 2023 - Present*
*Research Assistant, University of Minnesota Twin Cities*

- Collaborate with the medical device center of University of Minnesota Twin Cities and a surgeon to pinpoint and visualize the difficulty of a knee surgery in VR
- Developing a 3D spatial user interface for surgical training and practice
- Visualizing the key points by mapping the 3D video recordings of the surgery to the 3D anatomy model in Unity

**VR Authentication: Cognitive Methods of Memorization** *Jan. 2023 - Oct. 2023*
*Researcher, University of Minnesota Twin Cities*

- Worked jointly with others to conduct a within-subject study to evaluate the efficiency and security of different VR authentication methods and compare the different cognitive methods of memorization
- Used repeated measures design and qualitative data analysis methods
- Created a 3D spatial user interface in Unreal Engine
- Wrote a paper in submission for a conference

**Nurse Training: Virtual Simulation** *Sept. 2021 - Present*
*Research Assistant, University of Minnesota Twin Cities*

- Cooperated with nursing experts to conduct a formative study to assess the feasibility and a follow-up study to evaluate the effectiveness and user acceptance
- Used qualitative and quantitative data analysis methods in the formative study
- Designed the interview questions and interviewed participants in person for their feedback on the designed training scenarios
- Implemented a VR project of several nurse training scenarios in Unity
- Customized the patient avatar model, including appearance, voice and animation
- Generated several 3D medical device models in Blender
- Writing a paper for submission

**Understanding Communication Technology and Social Behavior** *Sept. 2020 - Present*
*Research Assistant, University of Minnesota Twin Cities*

- Partnered with psychologists to run a longitudinal experiment evaluating the social behaviors in a group and develop customized software for the study
- Trained undergraduate research assistants to use the developed software
- Deployed a multi-user VR application for mobile devices, supporting voice and animation synchronization
- Built a multi-user 3D application for Windows & MacOS to control the VR users

**Motion Sickness: Postural Sway Analysis in VR** *Sept. 2019 - May. 2020*
*Research Assistant, University of Minnesota Twin Cities*

- Teamed up with kinesiologists to conduct a study to analyze the pattern of postural sway data when users' motion sickness level change
- Programmed a software collecting data from a balance board for postural sway measurement
- Wrote a software capable of collecting data from most commercial VR devices

## Contest Projects

**VR Authentication: Direction-Based Authentication** *Dec. 2022 - Feb. 2023*
*IEEE VR 3DUI Contest*

- Designed a spatial user interface with snap-turning and an authentication system in VR
- Collaborated with others to implement the interface in the Unreal project
- Presented the publication in IEEE VR Conference 2023

**COVID Vision: Mind Social Distances** *Dec. 2020 - March 2021*
*IEEE VR 3DUI Contest*

- Developed a VR shopping project supporting both single-user and multi-user modes in Unity
- Led the team to collaborate and organize the modules implemented by each member
- Provided the visualization, interaction and feedback method
- Presented the publication in IEEE VR Conference 2021

## Work Experience

**Teaching Assistant, University of Minnesota Twin Cities** *Fall 2022 - Spring 2023*
*CSCI 4511W Introduction to Artificial Intelligence*

- Held office hours for students' questions and grading assignments and projects

## Awards & Hornors

Awarded the **Honorable Mention** of Mathematical Contest in Modeling, 2016, Consortium for Mathematics and its Applications (COMAP)
Awarded the **3rd Class Scholarship**, 2016, Sun Yat-sen University
Awarded the **3rd Class Scholarship**, 2015, Sun Yat-sen University

## Research Interests

Virtual Reality (VR) and Augmented Reality (AR)
3D user interface design
Human-Computer Interaction (HCI)
Computer Graphics and Animation

## Languages

**Chinese - Mandarin**: Native speaker
**English**: Advanced

## Reference Letters

**Prof. Evan Suma Rosenberg (Ph.D. advisor)**: Associate Professor, UMN
Email: suma@umn.edu