Shuqin Zhu
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Education

- **University of Southern California** — Los Angeles, CA
  Doctor of Philosophy in Computer Science; — *Aug. 2023 – Now*
  GPA: 3.7/4

- **University of Southern California** — Los Angeles, CA
  Research Assistant; — *Aug. 2022 – Jul. 2023*

- **Beijing Jiaotong University** — Beijing, China
  Bachelor of Engineering in Software Engineering; — *Sep. 2018 – Jul. 2022*
  GPA: 3.6/4

Research Experience

- **Haptic Feedback Rendering & Stewart Platform for Drones** — University of Southern California
  Advisor: Dr.Shahram Ghandeharizadeh & Dr.Daniel Seita — *June. 2025 – Present*
  - Using 3D-ViTac, mounted on a pair of parallel jaw gripper, to push, lift and rotate objects of different shapes and weight.
  - Built DL models to predict the mass and friction coefficient based on a sequence of sensor reading.
  - Aiming toward blind manipulation with only touch based sensor, and also the understanding of frigile structure when vision data is not enough.

- **Haptic Feedback Rendering & Stewart Platform for Drones** — University of Southern California
  Advisor: Dr.Shahram Ghandeharizadeh — *May. 2025 – Present*
  - Built a miniature drone that can carry the desired amount of load to meet the requirement for the task.
  - Developing a passive Stewart platform to measure drone force/torque and pose change.
  - Creating a collision-tolerant drone controller enabling stable flight post-impact.

- **Haptic Feedback Rendering: Friction Force** — University of Southern California
  Advisor: Dr.Shahram Ghandeharizadeh — *Feb. 2025 – Apr. 2025*
  - Designed and built a low-cost haptic feedback device rendering virtual-object friction using Karnopp's model.
  - Using the haptic device to render force, in order to simulate friction force of moving objects.
  - Conducted a user subject study to examine the human perception on force, and comapred the result using our device with the actual friction force.

Drone Catcher — University of Southern California
Supervised by Dr.Shahram Ghandeharizadeh & Dr.Daniel Seita — *Sep. 2024 - Dec.2024*

- Aim to address the challenge of using a dexterous hand as the end effector of a robot arm to catch a nano drone.
- Dive in to heterogeneous multi-agent collaborative manipulation. Explored the possibility of utilizing MARL to address the challenge.

FLSs Collision avoidance for Dronevision — University of Southern California
Supervised by Dr.Shahram Ghandeharizadeh — *Jan. 2024 - Now*

- Designed Flight Pattern for Dronevision, which can be used to guide multiple FLSs fly through a narrow opening to the charging coil.
- Simulated the system in a emulator, and implemented the Flight Pattern with Crazyflies and the Vicon motion capture system.
- Extended the Bio-inspired 3D flock-based boundary-sensitive collision avoidance technique to 3D, and adeoeted it in the context of a Dronevision.

Failure Handling and Group Formation for Flying Light Specks University of Southern California
Supervised by Dr.Shahram Ghandeharizadeh *July. 2023 - Mar. 2024*

- Based on our self-built multi-process emulator, emulate FLSs construct group formation using centralized and decentralized algorithm.
- Based on the emulator, emulate FLSs render a static illumination, while handling communications, replacement, new standby FLSs dispatching when FLSs fail .
- Proposed and implemented a technique to track FLSs in users field of view, so to identify obstructing standby FLSs, and provided solutions to solve this problem.

Path Planning and Collision Avoidance in FLS-3D-Illumination University of Southern California
Supervised by Dr.Shahram Ghandeharizadeh *Sep. 2022 - Now*

- Built decentralized algorithm for FLSs(Flying Light Specks, as for miniature drones with light source) to do collision avoidance and path planning.
- Measured the impact on illumination of important parameters, discussed performances of different collision avoidance algorithms.
- Used a Flight Pattern to solve Flying Light Specks landing or passing through a single opening in the context of a Dronevision(an FLS illumination infrastructure).

User Guidance Learning Effect Study in Virtual Environment Beijing Jiaotong University
Supervised by Dr.Xiaoping Che *Jul. 2021 - Jun. 2022*

- Applied Unity3D and create different forms of user tutorials for three VR games involving different types of operations respectively
- Invited 35 volunteers to play the three games and recorded their physiological indicators and game performances
- Utilized machine learning methods to study the impact of user characteristics and tutorial forms on user experience

Publications

1. Hamed Alimohammadzadeh, **Shuqin Zhu**, and Shahram Ghandeharizadeh. 2025. Techniques to Conceal Dark Standby Flying Light Specks. ACM Trans. Multimedia Comput. Commun. Appl. Just Accepted (April 2025). https://doi.org/10.1145/3724399
2. **S. Zhu** and S. Ghandeharizadeh. Circular Flight Patterns for Dronevision. In Second International Conference on Holodecks , Los Angeles, USA, December 19, 2024.
3. Hamed Alimohammadzadeh, **Shuqin Zhu**, Jiadong Bai, and Shahram Ghandeharizadeh. 2024. Reliability Groups with Standby Flying Light Specks. In Proceedings of the 15th ACM Multimedia Systems Conference (MMSys '24). Association for Computing Machinery, New York, NY, USA, 1–11. https://doi.org/10.1145/3625468.3647606
4. **S. Zhu**, S. Ghandeharizadeh. Flight Pattern for Swarms of Drones. Holodecks, Los Angeles, CA, Dec 15 2023.
5. Hamed Alimohammadzadeh, Rohit Bernard, Yang Chen, Trung Phan, Prashant Singh, **Shuqin Zhu**, Heather Culbertson, Shahram Ghandeharizadeh. "Dronevision: An Experimental 3D Testbed for Flying Light Specks", Holodecks, Los Angeles, CA, Dec 15 2023. arXiv:2308.10121.
6. **Shuqin Zhu**, Xiaoping Che, Chenxin Qu, Haohang Li, Siyuan Wang. "Which User Guidance Works Better in VR? A User Guidance Learning Effect Study in Virtual Environment", accepted by IEEE UIC 2022 as short paper.
7. Qu, Chenxin, Che, Xiaoping, Ma, Siqi, **Zhu, Shuqin**. "Bio-physiological-signals-based VR cybersickness detection." CCF Transactions on Pervasive Computing and Interaction (2022): 1-17.