

# Hamed Alimohammadzadeh

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## EDUCATION

### University of Southern California

August 2022 - Expected May 2027

Ph.D. Candidate in Computer Science (Passed Qualifying Exam- December 2024)

- Advised by Prof. Shahram Ghandeharizadeh

### University of Southern California

August 2022 - May 2024

Master of Science (MS) – Computer Science

### Sharif University of Technology

September 2017 - July 2022

Bachelor of Science (BS) – Computer Engineering

- Thesis: *Multi-Modal Object Detection by Improving Neural Network Learning*. Advised by Prof. Shohreh Kasaei.

## RESEARCH INTERESTS

**Machine Learning:** Utilizing machine learning techniques for visual rendering with swarm robotics.

**Swarm Robotics:** Decentralized localization of swarms of flying robots to render 3D point clouds.

**Human-Computer Interaction:** immersive multimedia displays using swarms of UAVs with haptic feedback.

## SKILLS

**Programming Languages:** Python, C/C++, JavaScript, Matlab

**Software & Tools:** OpenCV, Unity, Blender (Python API), OpenGL/WebGL, ROS, Fusion 360, MAVLink, Docker, Vue.js

## PUBLICATIONS

- [1] [Reproducibility Companion Paper: Swarical: An Integrated Hierarchical Approach to Localizing Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Ghandeharizadeh, F. Cunico, J. Springer.  
In Proceedings of the 33rd ACM International Conference on Multimedia, October 27–31, 2025.
- [2] [Illuminating English Letters Using a Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Ghandeharizadeh.  
In Proceedings of the 3rd International Workshop on UAVs in Multimedia: Capturing the World from a New Perspective (UAVM '25), October 27–28, 2025, March 14, 2025.
- [3] [Techniques to Conceal Dark Standby Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Zhu, S. Ghandeharizadeh.  
In ACM Transactions on Multimedia Computing, Communications and Applications, March 14, 2025.
- [4] [Swazure: Swarm Measurement of Pose for Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Ghandeharizadeh.  
In International Conference on Holodecks, Los Angeles, USA, December 19, 2024.
- [5] [Swarical: An Integrated Hierarchical Approach to Localizing Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Ghandeharizadeh.  
In ACM Multimedia, Melbourne, Australia, 28 October - 1 November 2024.

- [6] [Reliability Groups with Standby Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Zhu, S. Ghandeharizadeh  
In ACM SIGMM Conference on Multimedia Systems, Bari, Italy, April 15-18, 2024.
- [7] [Force-Feedback Through Touch-based Interactions With A Nanocopter](#)  
Y. Chen, **H. Alimohammadzadeh**, S. Ghandeharizadeh, H. Culbertson  
In 2024 IEEE Haptics Symposium (HAPTICS), Long Beach, USA, April 7-10, 2024.
- [8] [SwarMer: A Decentralized Localization Framework for Flying Light Specks](#)  
**H. Alimohammadzadeh**, S. Ghandeharizadeh  
In the First International Conference on Holodecks, Los Angeles, USA, December 15, 2023.
- [9] [A Conceptual Model of Intelligent Multimedia Data Rendered using Flying Light Specks](#)  
N. Yazdani, **H. Alimohammadzadeh**, S. Ghandeharizadeh  
In the First International Conference on Holodecks Los Angeles, USA, December 15, 2023.
- [10] [Towards a Stable 3D Physical Human-Drone Interaction](#)  
Y. Chen, **H. Alimohammadzadeh**, S. Ghandeharizadeh, H. Culbertson  
In First International Conference on Holodecks, Los Angeles, USA, December 15, 2023.
- [11] [Towards Enabling Complex Touch-based Human-Drone Interaction](#)  
Y. Chen, **H. Alimohammadzadeh**, S. Ghandeharizadeh, H. Culbertson  
In Workshop on Human Multi-Robot Interaction, IROS, Detroit, USA, October 1, 2023.
- [12] [An Evaluation of Decentralized Group Formation Techniques for Flying Light Specks](#)  
**H. Alimohammadzadeh**, H. Culbertson, and S. Ghandeharizadeh  
In ACM Multimedia Asia, Taipei, Taiwan, December 6-8, 2023.
- [13] [An Evaluation of Three Distance Measurement Technologies for Flying Light Specks](#)  
T. Phan, **H. Alimohammadzadeh**, H. Culbertson, and S. Ghandeharizadeh  
In International Conference on Intelligent Metaverse Technologies and Applications, Tartu, Estonia, September 18-20, 2023.
- [14] [Dronevision: An Experimental 3D Testbed for Flying Light Specks](#)  
**H. Alimohammadzadeh**, R. Bernard, Y. Chen, T. Phan, P. Singh, S. Zhu, H. Culbertson, and S. Ghandeharizadeh  
In the First International Conference on Holodecks, October 1, 2023.
- [15] [Modeling Illumination Data with Flying Light Specks](#)  
**H. Alimohammadzadeh**, D. Mehraban, and S. Ghandeharizadeh  
In Proceedings of the 14th Conference on ACM Multimedia Systems, Vancouver, Canada, June 7-10, 2023.

## EXPERIENCE

### **Flying Light Specks Lab (FLS Lab), University of Southern California**

August 2022 - Present

Research Assistant – PI: Prof. Shahram Ghandeharizadeh

- Design a novel collaborative localization algorithm enabling drones to autonomously form 3D formations; later optimized the algorithm's performance, achieving a 2x increase in speed for real-time deployment.
- Develop and implement multi-process emulators for decentralized algorithms across 1,000+ nodes, prioritizing high performance and scalability across AWS and Cloudlab environments using Python.
- Hands-on experience with Crazyflies to evaluate downwash effects and haptic interactions with multiple drones.
- Implement computer vision techniques using Raspberry Pi and camera modules for drones using C++ and Python for real-time position estimation.
- Build physical prototypes of a flying light speck as a miniature drone with self-reliant localization.

**Image Processing Lab (IPL), Sharif University of Technology**

September 2021 - July 2022

Research Assistant – PI: Prof. Shohreh Kasaei

- Enhanced the accuracy of mitosis detection by 7% across varied datasets by implementing a domain generalization algorithm for multi-domain mitosis figure detection using FastAI and RetinaNet in Python.

**Sotoon Cloud Services**

June 2020 - August 2022

Front-End Engineer

- Developed and maintained a web application for voice and image annotation using Vue with 120+ customers, doubling annotation speed.
- Designed and developed 10+ accessible components for a UI framework using Vue 3, TypeScript, and Tailwind enhancing user experience and accessibility standards.
- Mentored two front-end engineers in their onboarding process.

**LEADERSHIP****Board Chair, Students' Scientific Chapter (SSC), Sharif University of Technology**

July 2020 - July 2021

- Organized 10+ competitions, workshops, and extracurricular events, engaging 2,000+ participants and fostering a collaborative learning environment across the Department of Computer.

**Technical Lead, Sharif AI Challenge 2020, Sharif University of Technology**

November 2019 - April 2020

- Facilitated cross-team collaboration among four technical teams, including game designers, web developers, and software engineers, for designing and implementing a competition in AI held by SSC where 300+ AI agents compete against each other to win a tournament.

**TEACHING**

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|------------------------------------------------------|-----------------------|
| Database Systems (CSCI 585). Teaching Assistant.     | Fall 2024 & Fall 2025 |
| Web Technologies. Teaching Assistant.                | Fall 2020             |
| Web Technologies. Teaching Assistant.                | Fall 2019             |
| Advanced Programming (Java). Teaching Assistant.     | Spring 2019           |
| Introduction to Programming (C). Teaching Assistant. | Fall 2018             |

**SERVICE**

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|-------------------------------------------------------------------------------------------------------------------|------|
| Communication chair and program committee member of the 2nd International Conference on <a href="#">Holodecks</a> | 2024 |
| Reviewed 3 technical papers as an invited reviewer for ACM-Multimedia'24                                          | 2024 |
| Communication chair and program committee member of the First International Conference on Holodecks               | 2023 |
| Reviewed 3 technical papers as an invited reviewer for ACM-Multimedia'23                                          | 2023 |

**MENTORSHIP**

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|-------------------------------------------------------------------|------|
| Phong Nguyen & Allen Lam (undergraduate, USC CURVE program)       | 2025 |
| Kariena Panpaliya & Xuanyu Pan (undergraduate, USC CURVE program) | 2024 |
| Wallace Browning (undergraduate, USC)                             | 2024 |

**MEDIA**

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|-------------------------------------------------------------------------------------------------------------------------|------|
| Our work for the Holodecks conference is featured in the <a href="#">USC Viterbi School of Engineering news article</a> | 2024 |
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**AWARDS**

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|--------------------------------------------------------------|------|
| USC Graduate School Fellowship for 1 year of the PhD program | 2022 |
|--------------------------------------------------------------|------|

- RoboCup Iran Open 2nd rank in Junior Rescue-A League 2015
- RoboCup Iran Open 1st in Junior Rescue-A super-team competition 2015

## PROJECTS

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Real-Time UAV Teleoperation with Haptic Feedback 2023

- Created a system for bidirectional teleoperation of a UAV with haptic feedback for obstacle avoidance, demonstrating skills in building responsive, real-time systems.

Scalable Social Media Platform 2021

- Designed and developed a scalable social media platform from the ground up using a microservices architecture, demonstrating experience in building the backend for online services.
- Implemented backend services in Express.js, containerized the system with Docker, and managed traffic with an NGINX load balancer to ensure high availability and performance.