

Hamed Alimohammadzadeh

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EDUCATION

University of Southern California

August 2022 - Expected 05/26

Doctor of Philosophy (Ph.D.) – Computer Science

- 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

Swarm Robotics: coordinate swarms of flying robots to render 3D point clouds.

Computer Vision: use vision to determine the position of robots in swarms for localization.

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

SKILLS

Programming Languages: Python, C/C++, JavaScript, MATLAB, Java, C#

Software & Tools: OpenCV, Unity, Blender, Pandas, PyTorch, scikit, OpenGL/WebGL, ROS

Additional Skills: Graphic Design (Photoshop, Illustrator), Web Development (Vue, TypeScript, React, Express, MongoDB)

PUBLICATIONS

- [1] [Swarical: An Integrated Hierarchical Approach to Localizing Flying Light Specks](#)
H. Alimohammadzadeh, S. Ghandeharizadeh.
In ACM Multimedia, Melbourne, Australia, 28 October - 1 November 2024.
- [2] [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.
- [3] [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.
- [4] [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.
- [5] [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.

- [6] [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.
- [7] [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.
- [8] [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.
- [9] [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.
- [10] [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.
- [11] [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

- Research technologies to realize 3D multimedia displays using miniature drones, including the design of fast localization algorithms, group formation techniques, and haptic interactions.
- Design decentralized localization algorithms for swarms of drones to illuminate 3D point clouds efficiently.
- Create multi-process and multi-threaded emulators for decentralized algorithms with 1000+ communicating nodes on AWS and Cloudlab using Python.
- Hands-on experience with Crazyflies to evaluate downwash effects and haptic interactions with multiple drones.
- Implement real-time position estimation techniques using Raspberry Pi and camera modules for drones.

Image Processing Lab (IPL), Sharif University of Technology September 2021 - July 2022

Research Assistant – PI: Prof. Shohreh Kasaei

- Implemented 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 accessible components for a UI framework using Vue 3, TypeScript, and Tailwind.
- Designed interview tasks and interviewed 60+ applicants for front-end engineering positions.
- 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 at the Department of Computer Engineering at Sharif University of Technology, attracting 2000+ participants country-wide.

Technical Lead, Sharif AI Challenge 2020, Sharif University of Technology November 2019 - April 2020

- Led 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.

SERVICE

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- Communication chair and program committee member of the 2nd International Conference on [Holodecks](#) 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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- Kariena Panpaliya (undergraduate, USC CURVE program) 2024
 - 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 [USC Viterbi School of Engineering news article](#) 2024

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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- Created a system for bidirectional teleoperation of a UAV with haptic feedback for obstacle avoidance, using 3D Systems Touch Haptic Device and Crazyflies. 2023
 - Developed a minimalistic social media platform using microservices architecture, utilizing Express.js for backend services, Vue.js for the frontend, NGINX for load balancing, and Docker for containerization. 2021