

# Alexander 'Sasha' Vilesov

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Website: <https://asvilesov.github.io>

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## Education

PhD ECE:	University of California, Los Angeles (UCLA)	GPA: 4.00	2021 - Current
MS ECE:	University of California, Los Angeles (UCLA)	GPA: 4.00	2021 - 2023
BS ECE:	University of Southern California (USC)	GPA: 3.93	2017 - 2021

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## Professional Experience

UCLA PhD Researcher in the Visual Machines Group 2021 - Current  
Computer vision and Computational Imaging Advised by Professor Achuta Kadambi

- Text-to-3D Generation: Developed method for multi-object generation of compositional scenes from text using 3D Gaussian Splatting, text-to-image diffusion models, and physical priors [3]. Currently leading a project for developing a method on incorporating computer graphics instancing for scalable large-scale text-to-3D scene generation.
- Equity in Computer Vision and Remote Healthcare: Developed method and collected large-scale public dataset (~100 participants) for multi-modal fusion of camera and FMCW radar for skin-tone equitable remote-plethysmography and heart-rate detection [1]. Explored skin-tone fairness of thermal-imaging detectors and developed a method for mitigating bias after sun-exposure [2]. Currently leading a project in contact-free sleep apnea detection.

NASA JPL Software Intern 2020 - 2021  
In orbit GPS Tracking Advised by Thomas Meehan

- Developed C++ library for on-board processing in Cosmic-2 satellites to acquire in orbit GPS signals of the European Galileo constellation. Applied 2D doppler frequency shift search of GPS codes on raw antenna data to account for high relative orbiting velocities.
- Developed C++ library for decoding Galileo GPS signals to form Ephemeris and Almanac data and predicting future orbital trajectories of Galileo satellites.

USC Undergraduate Researcher in S2L2 Lab 2019 - 2021  
Imitation and Reinforcement Learning Advised by Professor Rahul Jain

- Researched inverse reinforcement learning of autonomous agents and evaluated reinforcement learning algorithms like Deep Q Learning for image based environments.

USC Undergraduate Researcher in GSP Lab 2018 - 2019  
Graph Signal Processing Advised by Professor Antonio Ortega

- Learned about Graph Signal Processing to analyze properties of graphs.
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## Teaching Experience

UCLA Graduate Teaching Assistant:

- ECE113 Digital Signal Processing (120 person class) Fall 2022, Winter 2023
    - Lead discussion sections and designed quizzes/homeworks/exams.
  - ECE189 Honors Digital Signal Processing (30 person class) Winter 2023
    - Lead lectures and discussions.
    - Created a computer-vision competition with a live leaderboard that students actively submitted versions of their project throughout the quarter.
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## Skills and Interests

Research Interests: content generation, text-to-3D, diffusion models, computer graphics, eye-tracking

Programming: Python and C++ (PyTorch, OpenCV, Git, CMake, Boost)

Github Link: <https://github.com/asvilesov>

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## Awards

Artificial Intelligence Rising Scholar Research Award (AIRS)	2022
NSF Graduate Research Fellowship (GRFP), Honorable Mention	2022
USC Engineering Dean's List	2017-2021
Rose Hills Fellowship	2020

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## Publications

1. Vilesov, Alexander, Pradyumna Chari, Adnan Armouti, Anirudh Bindiganavale Harish, Kimaya Kulkarni, Ananya Deoghare, Laleh Jalilian, and Achuta Kadambi. "Blending camera and 77 GHz radar sensing for equitable, robust plethysmography." *ACM Transactions on Graphics (SIGGRAPH)* 41, no. 4 (2022): 1-14. [Project Webpage](#).
  2. Zhao, Ellin Q., Alexander Vilesov, Shreeram Athreya, Pradyumna Chari, Jeanette Merlos, Kendall Millett, Nia St Cyr, Laleh Jalilian, and Achuta Kadambi. "Making thermal imaging more equitable and accurate: resolving solar loading biases." *arXiv preprint arXiv:2304.08832* (2023).
  3. Vilesov, Alexander, Pradyumna Chari, and Achuta Kadambi. "CG3D: Compositional Generation for Text-to-3D via Gaussian Splatting." *arXiv preprint arXiv:2311.17907* (2023). [Project Webpage](#).
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## References

UCLA CS/ECE Professor Achuta Kadambi: [achuta@ee.ucla.edu](mailto:achuta@ee.ucla.edu)

UCLA School of Medicine Doctor Laleh Jalilian: [ljalilian@mednet.ucla.edu](mailto:ljalilian@mednet.ucla.edu)

USC ECE Professor Rahul Jain: [rahul.jain@usc.edu](mailto:rahul.jain@usc.edu)

NASA JPL Engineer Thomas Meehan: [thomas.k.meehan@jpl.nasa.gov](mailto:thomas.k.meehan@jpl.nasa.gov)