Ethan Seefried

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Education

- **Colorado State University, Fort Collins, CO** *Expected: May 2026*
  Doctor of Philosophy: Computer Science GPA: 3.93
- **Colorado State University, Fort Collins, CO** *May 2024*
  Masters of Science: Computer Science
- **Colorado State University, Fort Collins, CO** *May 2022*
  Bachelor of Science: Computer Science
- **Colorado State University, Fort Collins, CO** *May 2022*
  Bachelor of Science: Physics

Peer-Reviewed Publications & Presentations

- **Publication** *July 2024*
  HCII: International Conference on Human Computer Interaction Washington D.C., USA
  – **Seefried, Ethan**, et al. "Learning Foreign Language Vocabulary Through Task-Based Virtual Reality Immersion." International Conference on Human-Computer Interaction. Cham: Springer Nature Switzerland, 2024.

- **Publication** *June 2024*
  Synthetic Data for Computer Vision Workshop@ CVPR 2024 Seattle, Washington
  – **Seefried, Ethan**, et al. "Balancing Quality and Quantity: The Impact of Synthetic Data on Smoke Detection Accuracy in Computer Vision." Synthetic Data for Computer Vision Workshop@ CVPR 2024. 2024.

- **Publication** *October 2023*
  ICMI: 25th ACM International Conference on Multimodal Interaction Paris, France
  – Fitzgerald, Jack & **Seefried, Ethan** & Yost, James & Pallickara, Sangmi & Blanchard, Nathaniel. (2023). Paying Attention to Wildfire: Using U-Net with Attention Blocks on Multimodal Data for Next Day Prediction. 470-480. 10.1145/3577190.3614116.

- **Poster Presentation** *June 2024*
  CVPR 2024 Seatle, WA
  – Balancing Quality and Quantity: The Impact of Synthetic Data on Smoke Detection Accuracy in Computer Vision

- **Poster Presentation** *October 2023*
  ICMI: 25th ACM International Conference on Multimodal Interaction Paris, France
  – Paying Attention to Wildfire: Using U-Net with Attention Blocks on Multimodal Data for Next Day Prediction

- **Poster Presentation** *November 2022*
  Computer Science Graduate Research Symposium Fort Collins, CO
  – Fine Grained Opacity Predictions: Utilizing Synthetic Data

Research Experience

- **Colorado State University** *August 2022 - Present*
  Graduate Research Assistant: Computer Vision Lab Fort Collins, CO
  – **Millikan's Oil Drop Using Computer Vision**
    * Theorized computer vision techniques to predict velocity of charged particles viewed through a microscope
    * Supervised an REU student during the summer of 2024, leading to the achievement of the "Best Poster" award
    * Collected a dataset of 200 charged particles with an error rate of 2%
  – **Synthetic Data Generation via Game Engines**
    * Designed virtual industrial settings in Unreal Engine 5 and NVIDIA Omniverse to synthetically generate smoke

* Implemented novel computer vision models to detect smoke in real-world data
* Explored the balance between the quantity and quality of synthetic data required for detecting amorphous objects

– **CSU101**
* Constructed a dataset for Computer Vision education, consisting of image classification and object detection labels
* Led and trained a team of eight researchers in data collection and annotation techniques
* Publicly deployed and curated the CSU101 dataset on Kaggle

– **Perceiving Colors as an Auditory Sense**
* Designed a fully virtual environment to teach colors as a physical phenomenan
* Conducted studies on chromesthesia by teaching participants to represent colors in virtual reality
* Developed a custom Stroop test to compare visual and auditory sensory processing

– **Utilizing Virtual Reality and Task Based Learning to Teach a Foreign Language**
* Designed a VR kitchen environment and task to teach Spanish to English speakers
* Statistically analyzed separate groups of participants to identify core learning modalities
* Led a team of 5 students in data collection and VR design principles

– **Smoke School Dataset Collection**
* Curated the only publicly known smoke dataset containing opacity labels
* Designed an experimental setup to collect and annotate 716 GB of smoke releases for opacity predictions of smoke
* Led a team of 4 graduate students on building a novel machine learning architecture to identify and estimate the opacity of smoke

– **Wildfire Prevention**
* Published a class project in one month with 2 other graduate students to predict the spread of a wildfire over the course of 24 hours
* Simplified a custom architecture to run 300% faster, while maintaining similar accuracy to larger models
* Conducted experiments to identify key features that lead to wildfire spread

– **Computer Vision Reading Group**
* Conducted a weekly reading group consisting of 6 graduate students and 4 undergraduate students
* Studied modern literature to assign and review papers to further research across the computer vision lab
* Scheduled weekly presentations on relevant topics in computer vision and adjacent fields

- **Colorado State University** *August 2021 - July 2022*
  Undergraduate Research Assistant: Computer Vision Lab Fort Collins, CO

– **Collaborative Group Work Analysis**
* Designed a portable system to efficiently record voice and video of participants in a classroom environment without disruption
* Developed a multi-camera script to record a 360 degree view ensuring all students were recorded

– **Ringelmann Smoke Prediction**
* Collaborated with a graduate student to develop a prototype machine learning model, aimed at predicting Ringelmann numbers for real-world oil and gas site emissions
* Utilized Unreal Engine to generate high-fidelity synthetic data, enriching the training dataset for the Ringelmann model

- **Colorado State University** *August 2019 - January 2020*
  Undergraduate Research Assistant: CSU Lasers Lab, Physics Fort Collins, CO

– **Laser Component Design**
* Independently taught SolidWorks CAD software, enabling the design and fabrication of specialized components for integration into the CSU Advanced Laser system
* Engineered and constructed an adjustable camera stand, specifically tasked with capturing high-precision images of the main chamber for advanced laser research

Teaching Experience

- **Colorado State University** *Spring 2024*
  CS 455/555: Distributed Systems Fort Collins, CO

– **Teaching Assistant**
* Scheduled and conducted demos for students to explain their code and reasoning
* Designed quizzes and tests for two seperate course sections

* Guided students through class projects involving machine learning and working with large datasets

- **Colorado State University** *Fall 2022 & Fall 2024*
  CS 462: Virtual Worlds Fort Collins, CO
  – **Teaching Assistant**
    * Conducted weekly office hours, providing supplementary instruction in game design and offering targeted homework assistance to enhance student understanding and performance
    * Guided students in mastering essential tools such as Blender and Unity, facilitating their proficiency in critical applications for game development
    * Evaluated and graded 120 final projects, assessing games developed in Unity for their design intricacy and functional execution

Professional Experience

- **United States Marine Corps** *April 2013 - April 2017*
  Heavy Equipment Operator Okinawa, Japan
  – **Leadership & Teamwork**
    * Led a team of 50 Marines, managing daily schedules and supervising operations to ensure optimal efficiency and mission readiness
    * Charged with safely moving 10 million dollars' worth of equipment on a daily basis
    * Enhanced time management and organizational skills through adherence to a rigorous daily schedule from 5 AM to 5 PM, optimizing productivity and efficiency

Relevant Coursework

Computer Vision: Image Computation, Introduction to Artificial Intelligence, Introduction to Machine Learning, Big Data, Intro to Statistics, Linear Algebra
Natural Language Processing: Introduction to Natural Language Processing, Algorithms
HCAI: 3d User Interfaces, Perceptual Elements in Extended Reality, Introduction to Computer Science Research
Mathematics & Physics: Calculus 3, Differential Equations, Quantum Mechanics, Classical Mechanics, Optics, Electricity and Magnetism, Thermodynamics, Advanced Physics Lab, Modern Physics

Relevant Class Projects

- **Colorado State University** *January 2020 - May 2023*
  Undergraduate and Graduate Projects Fort Collins, CO
  – **Athletics: Velocity Prediction**
    * Implemented the SWIN transformer in a machine learning model to analyze RGB video data, successfully predicting the velocity of athletes during box jumps
    * Applied cross-fold validation methods to overcome the limitations of a small dataset, achieving an accuracy of approximately 40%
    * Demonstrated the potential of advanced AI techniques in sports performance analysis
  – **Software Engineering: Trip Planner**
    * Led a team of 5 developers building a trip planning website utilizing Javascript, SQL, Java and ReactStrap
    * Charged with writing test cases to bring total code coverage from 50% to 80%
    * Completed a functional trip builder where users could select anywhere in the world and receive an optimized plan for the shortest route between countries via airports

Technical Skills and Interests

Programming Languages: Python, Java, C, C++, SQL
Frameworks: Pytorch, Tensorflow, Keras, Pytorch Distributed
Operating Systems & Technologies: Linux, Mac OS, Windows, Git/Github, LaTex
Computer Science Interests: Computer Vision, Natural Language Processing, Virtual Reality, Human Computer Interactions

Leadership Activities

- **Vice President & Co-Founder,** CSU Computer Vision Club *December 2023 - Present*
- **Vice President,** Society of Physics Students *August 2021 - May 2022*

Achievements & Awards

- **Awards** CSU Graduate Student Grant *Fall 2023*
- **Achievement** Deans List *Spring 2022*

Volunteer Experience

- **United States Marine Corps** *July 2013*
  Volunteer Springfield, MO
  - **Flooded City: Home Rebuilding**
    * Volunteered to restore homes that had been significantly damaged by flooding
    * Removed debris from yards and river banks, that posed significant danger