

# JOSEPH FIORESI (PH.D. STUDENT)

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U.S. Citizen **Research Interests:** Privacy-Preserving Computer Vision, Responsible AI, Bias Mitigation,  
Large Multimodal Models (video-language), Video Understanding

## Education

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**Ph.D. in Computer Science** University of Central Florida, USA Aug 2022 – May 2026 (Expected)  
Advisor: Dr. Mubarak Shah, GPA: 4.0/4.0 *ORC Doctoral Fellowship*

**B.Sc. in Computer Science** University of Central Florida, USA 2018 – 2022  
GPA: 4.0/4.0 *Mathematics Minor / National Merit Finalist / Benacquisto Scholarship*

## Publications

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- Joseph Fiorese**, Ishan Dave, and Mubarak Shah. ALBAR: Adversarial Learning approach to mitigate Biases in Action Recognition, International Conference on Learning Representations (**ICLR**), 2025.
- Joseph Fiorese**, Ishan Dave, and Mubarak Shah. TeD-SPAD: Temporal Distinctiveness for Self-supervised Privacy-preservation for video Anomaly Detection, IEEE/CVF International Conference on Computer Vision (**ICCV**), 2023.
- Andrew M. Gabor, Philip J. Knodle, Maurice Covino, **Joseph Fiorese**, Dylan J. Colvin, Kristopher O. Davis. Electroluminescence Analysis and Grading of Hail Damaged Solar Panels, IEEE Journal of Photovoltaics (**JPV**), 2022.
- Joseph Fiorese**, Dylan Colvin, Rafaela Frota, Rohit Gupta, Mengjie Li, Hubert Seigneur, Shruti Vyas, Sofia Oliveira, Mubarak Shah, Kristopher O. Davis. Automated Defect Detection and Localization in Photovoltaic Cells Using Semantic Segmentation of Electroluminescence Images, IEEE Journal of Photovoltaics (**JPV**)/Photovoltaics Specialists Conference (PVSC), 2021.
- (Under review) **Joseph Fiorese**, Ishan Dave, and Mubarak Shah. Privacy Beyond Pixels: Latent Anonymization for Privacy-Preserving Video Understanding, 2024.
- (Under review) Shaina Raza, Rizwan Qureshi, Anam Zahid, **Joseph Fiorese**, Ferhat Sadak, Muhammaed Saeed, Ranjan Sapkota, Aditya Jain, Anas Zafar, Muneed Ul Hassan, Aizan Zafar, Hasan Maqbool, Jia Wu, Maged Shoman. Who is Responsible? The Data, Models, Users or Regulations? Responsible Generative AI for a Sustainable Future, 2024.

## Work Experience

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**Center for Research in Computer Vision (CRCV)** *Graduate Research Assistant* Aug 2022 – Present

- Perform rigorous theoretical computer vision research in various multimodal video understanding tasks with a specialization in privacy constraints and AI fairness.
- Regularly engaged in collaborative research with peers and professors, fostering interdisciplinary cooperation.

**Better Solar LLC** *Co-founder and Chief Technology Officer* Apr 2022 – Jan 2024

- Secured startup funding through the DoE American-Made Solar Prize Round 5 competition.
- Responsible for the development and deployment of a SaaS web application on Google Cloud Platform.

**Computer Vision NSF REU** *Undergraduate Student Researcher* May 2020 – Aug 2020

- Participated in a fast-paced learning program designed to give realistic research experience.
- Developed code to semantically segment defects in solar panels with a custom confidence threshold.
- Oral presentation at Photovoltaic Specialists Conference, invited for publication in IEEE Journal of Photovoltaics.

## Major Research Projects

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**Video-Language Models/Large Multimodal Models (LMMs)** Mar 2024 – present

- Reducing Text Bias in VQA* (Mar 2024 - Present): Working to identify issue of Video LMMs answering questions based more on text instead of visual content, along with proposing methods to mitigate it. We are proposing new evaluation protocols to better quantify this problem. Our methods aim to instill richer visual understanding tokens into the LLM, mitigating many text-driven hallucinations.
- Privacy/Anonymization in LMMs* (Mar 2024 - Present): Identifying and mitigating privacy concerns in LMMs, specifically related to sensitive visual private attributes (perceived gender, skin color, etc.).
- Video Referential Dialogue* (Sept 2024 - Present): Expanding grounding pipeline to handle dialogue that spatio-temporally refers to objects present in videos, enabling highly grounded conversation with LMMs.
- VQA Grounding in Video LMMs* (May 2024 - Sept 2024): Developed a framework to enable object-level VQA grounding in open-source LMM models (LLaVA-OneVision, VideoGPT+), improving the visual perception ability of LMMs.

## Privacy Preserving/Fair Video Understanding

Aug 2022 – present

- *Privacy Preserving General Video Foundation Models*[5] (Aug 2023 - Sept 2024): Developed a novel privacy preserving framework that moves anonymization training from the input pixel space to the latent feature space. The framework supports training across multiple downstream video understanding tasks, and shows state-of-the-art tradeoffs between privacy and utility across all tasks, including those unseen during anonymization training.
- *ALBAR Framework*[1] (Mar 2023 - Sept 2024): Developed a novel adversarial debiasing framework that reduces the effect of all static biases (from both the *background* and *foreground* in video action recognition models. Without requiring additional labels/classifiers (scene, clothing, etc.), our method achieved SOTA on difficult bias evaluation protocols.
- *Action Fairness* (March 2023 - Present): Studying the effect and potential biases of sensitive visual private attributes such as gender, skin color, clothing, etc. in large video action recognition models.
- *Privacy Preserving Video Anomaly Detection*[2] (Aug 2022 - March 2023): Developed a privacy-aware video anomaly detection framework utilizing temporally-distinctive video representations, achieving state-of-the-art tradeoff between privacy protection and utility performance on three popular weakly supervised VAD datasets.

## Photovoltaic Defect Analysis

May 2020 – Dec 2021

- *PV Defect Segmentation Model/Dataset*[4] (May 2020 - Dec 2021): Helped plan out a project to automatically identify defects in electroluminescence images of solar modules. Annotated a dataset by hand with pixel-level defect masks labelled by category, developed model to achieve high segmentation performance.

## Funded Projects

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### NSF Center for Smart Streetscapes (CS3) Engineering Research Center

Jan 2023 – Present

- Worked on projects in a multidisciplinary, cross-university engineering research center focused on developing smart city technologies to deploy in various urban environments. Focusing on situational awareness and privacy aspects.
- Served a year as a University Representative on the Student Leadership Council (SLC) to serve as a liaison between student and faculty members. Responsible for hosting numerous events and performing a center-wide SWOT analysis.
- Presented work to Harlem community members for feedback on real-world applicability of our work.

## Awards and Honors

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2 <sup>nd</sup> place	Google DeepMind Perception Test Challenge (Grounded VQA) ( <b>ECCV</b> )	2024
eBay HSI Battle of the Brains Scholarship Awardee	One of 4 chosen among 200+ competitors	2023
3 <sup>rd</sup> place	HSI Battle of the Brains Competition	2023
ORCGS Doctoral Fellowship		2022-2027
National Merit Finalist		2018

## Skills

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Programming Languages	Python, MATLAB
Deep Learning frameworks	PyTorch, Keras
Tools/Frameworks	GCP, OpenCV, SciKit, Matplotlib

## Coursework

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- Advanced Computer Vision (*CAP 6412*)
- Computer Vision Systems (*CAP 6411*)
- Deep Learning Mathematics (*MAP 6197*)

## Professional Services

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- Reviewer for CVPR, ICLR, ECCV, NeurIPS, BMVC, ICASSP, IJCNN, IEEE TCSVT
- Technical Committee, BMVC Privacy and Fairness Workshop 2024
- Mentored student of NSF Research Experience for Undergrad (REU) 2024

## Character Referees

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- Dr. Mubarak Shah, UCF Board of Trustees Chair Professor, University of Central Florida, shah@crcv.ucf.edu
- Dr. Kristopher Davis, Professor, University of Central Florida, kristopher.davis@ucf.edu
- Dr. David Penn, Lecturer, University of Central Florida, david.penn@ucf.edu