Tanushree Banerjee

Incoming CS PhD Student at the University of Maryland in Computer Vision and Graphics

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EDUCATION

2025 – 2030 (Expected) **Doctor of Philosophy (PhD), Computer Science**, *University of Maryland*, College Park, MD
Received the Dean's Fellowship. Advised by Prof. Matthias Zwicker

2020 – 2024 **Bachelor of Science in Engineering (BSE), Computer Science**, *Princeton University*, Princeton, NJ
Graduated *magna cum laude*. Departmental GPA: 3.866
Thesis: *Towards Inverse Neural Rendering for Explainable 3D Perception*, Advisor: Prof. Felix Heide

RESEARCH EXPERIENCE

2024 – 2025 **Pre-Doctoral Research Assistant**, *Princeton Computational Imaging Lab*, Princeton, NJ
Advised by Prof. Felix Heide. Developing explainable methods for 3D object detection via inverse generation.

2023 – 2024 **Undergraduate Research Assistant**, *Princeton Computational Imaging Lab*, Princeton, NJ
Advised by Prof. Felix Heide. Building a novel algorithm enabling 3D multi-object tracking via inverse rendering.

2022 – 2023 **Undergraduate Research Assistant**, *Princeton NLP Group*, Princeton, NJ
Advised by Prof. Karthik Narasimhan. Exploring human and AI-in-the-loop systems and LLM self-refinement methods for improving the performance of LLMs on nuanced tasks such as lie detection.

Summer 2021 **Summer Research Assistant**, *Princeton Visual AI Lab*, Princeton, NJ
Advised by Prof. Olga Russakovsky. Investigated a novel application-focused human action recognition dataset from police body-worn camera videos.

MANUSCRIPTS AND PRE-PRINTS

arXiv Preprints

arXiv 2024 **Inverse Neural Rendering for Explainable Multi-Object Tracking.**
Julian Ost*, **Tanushree Banerjee***, Mario Bijelic, Felix Heide — Project Page | Paper | arXiv:2404.12359
Under review at *Nature Machine Intelligence*. We recast 3D multi-object tracking from RGB cameras as an inverse rendering problem. Our method is not just an alternate take on tracking; it enables examining generated objects and reasoning about failure cases.

arXiv 2024 **LLMs are Superior Feedback Providers: Bootstrapping Reasoning for Lie Detection with Self-Generated Feedback.**
Tanushree Banerjee, Richard Zhu, Runzhe Yang, Karthik Narasimhan — Paper | arXiv:2408.13915
We investigated a bootstrapping framework that leverages LLM-generated feedback to detect deception in diplomacy games. Our approach achieved a 39% improvement over the zero-shot baseline in lying F1 without any training.

Undergraduate Thesis

2024 **Inverse Neural Rendering for Explainable 3D Perception**, *Princeton University.*
Advisor: Prof. Felix Heide — Thesis Report | Abstract
This thesis explores unlocking explainable 3D perception via Inverse Neural Rendering. *Part I* proposes and evaluates a novel take on 3D multi-object tracking, while *Part II* proposes recasting 3D object detection as an inverse generation problem.

HONORS AND AWARDS

2025 **Dean's Fellowship at the University of Maryland**, *in recognition of outstanding academic achievement.*

2024 **Outstanding Computer Science Senior Thesis Prize at Princeton University**, *for the thesis titled "Inverse Neural Rendering for Explainable 3D Perception", awarded to one of only 6 students among 216 in the graduating class of the CS department.*

2024 **FitzRandolph Gate Award at Princeton University**, *for presenting my work on "Inverse Neural Rendering for Explainable 3D Tracking" at Princeton Research Day 2024.*

2023 **CRA Outstanding Undergraduate Research Award Nomination by the Princeton Computer Science department**, *for my contributions to the paper "Bootstrapping Reasoning for Lie Detection with Self-Generated Feedback".*

TEACHING EXPERIENCE

Spring 2024 **Undergraduate Course Assistant**, *Independent Work Seminar: AI for Engineering and Physics*, Princeton University

Summer 2022 **Research Instructor**, *Princeton AI4ALL*, Princeton University