Tanushree Banerjee

Incoming CS PhD Student at the University of Maryland

EDUCATION

- 2025 2030 Doctor of Philosophy (PhD), Computer Science, University of Maryland, College Park, MD (Expected) 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 Al-in-the-loop systems and LLM self-refinement methods for improving the performance of LLMs on nuanced tasks such as lie detection.
- Summer Research Assistant, Princeton Visual AI Lab, Princeton, NJ Summer 2021 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 a peer-reviewed journal. 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 **S** 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.

𝚱 Thesis Report | Abstract

Advisor: Prof. Felix Heide 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