TANUSHREE BANERJEE

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EDUCATION

2020 – 2024
GPA: 3.86
(Dept.)

Bachelor of Science in Engineering (BSE) at Princeton University, *Dept. of Computer Science*, Princeton, NJ
- Graduated *magna cum laude*
- Thesis title: *Towards Inverse Neural Rendering for Explainable 3D Perception*

RESEARCH EXPERIENCE

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

2023 – 2024 **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 **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 **Princeton Visual AI Lab**, *Princeton, NJ*
Advised by Prof. Olga Russakovsky. Investigated a novel application-focused human action recognition dataset from police body-cam 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

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 CS Department graduating class.*

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