

# Nobline Yoo

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## EDUCATION

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<b>Princeton University</b> M.S.E. in Computer Science	SEPT 2024–MAY 2026 GPA: 4.0/4.0
<b>Princeton University</b> B.S.E. in Computer Science Certificates in Statistics & Machine Learning and Robotics	SEPT 2019–MAY 2023 GPA: 3.948/4.0

## PUBLICATIONS & PREPRINTS

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**Nobline Yoo**, Olga Russakovsky, Ye Zhu. “**D2D: Detector-to-Differentiable Critic for Improved Numeracy in Text-to-Image Generation.**” *Preprint*, 2025. [[website](#)] [[paper](#)]

**Nobline Yoo**, Olga Russakovsky. “**Efficient, Self-Supervised Human Pose Estimation with Inductive Prior Tuning.**” *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, 2023 (ROAD++ Workshop)*. [[code](#)] [[paper](#)]

- Additionally presented at the Women in Computer Vision (WiCV) workshop.

Arjun Mani, **Nobline Yoo**, Will Hinthorn, Olga Russakovsky. “**Point and Ask: Incorporating Pointing into Visual Question Answering.**” Poster spotlight at *Visual Question Answering (VQA) workshop at CVPR 2021*. [[code](#)] [[paper](#)]

## RESEARCH PROJECTS

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**Improving numeracy in text-to-image models** SEPT 2024–Present

*Advised by Professor Olga Russakovsky, Professor Ye Zhu | Princeton Visual AI Lab*

- Proposed novel way (D2D) to convert detectors into differentiable critics via new activation functions, allowing text-to-image models to leverage more robust count reasoning.
- Repositioned numeracy correction as initial noise selection problem and introduced a test-time, tunable Latent Modifier Network that corrects the initial noise using our D2D critic. Boosted accuracy by up to 13.7%, with minimal inference cost.

**Self-supervised Human Pose Estimation** SEPT 2022–OCT 2023

*Advised by Professor Olga Russakovsky | Princeton Visual AI Lab*

- Proposed a self-supervised model pipeline that outperforms the baseline using 3x less data, by employing inductive prior tuning, coarse-to-fine learning, and data augmentation.
- Identified the importance of inductive prior tuning to aligning pose estimation and reconstruction tasks, the central assumption behind self-supervision.

## Digital Humanities Tools as Sites of Human-Computer Interaction

JAN 2022–MAY 2022

Advised by *Professor Brian Kernighan* | **Princeton Independent Work Seminar** | [[code](#)] [[paper](#)]

- Created analysis tool for dataset *Chronicling America*, using word vector analysis and topic modeling, and identified digital humanities tools as sites of human-computer interaction.
- **Awarded** the Independent Work Award by the Princeton Center for Statistics and Machine Learning and **featured** by the Princeton Center for Digital Humanities.

## Incorporating Pointing into Visual Question Answering

FEB 2020–JUN 2021

Advised by *Professor Olga Russakovsky* | **Princeton Visual AI Lab**

- Created datasets to stress-test Visual Question Answering system on ambiguous questions and conducted analysis on the effectiveness of point supervision versus verbal disambiguation of objects in scene.
- Played with uncertainty in Visual Question Answering models to improve model robustness.

## COURSE PROJECTS

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### Incorporating VLMs into Text-to-Image Correction Pipeline

SEPT–DEC 2024

*Advanced Topics in Computer Science: Deep Dive into Large Language Models*

- Explored incorporating VLMs GPT-4o and PaliGemma into image correction pipeline presented in Wu, Tsung-Han, et al. “Self-correcting LLM-controlled Diffusion Models.”
- Achieved performance improvements across all benchmarks used for evaluation, with a jump of 6% on the LMD benchmark.

### Perceptual Losses for Point-Based Neural Fields

APR–MAY 2023

*Neural Rendering* | [[code](#)] [[paper](#)]

- Explored MS-SSIM and Canny edge-based losses for novel view synthesis method proposed in Zhang, Qiang, et al. “Differentiable Point-Based Radiance Fields for Efficient View Synthesis.”
- Showed a simple modification to Zhang et al. that yields a 4.68 increase in PSNR on a real-world scene from the LLFF dataset.

### Prefix Tuning: Optimizing Large Language Models

JAN–MAY 2022

*Natural Language Processing* | [[code](#)] [[paper](#)] [[poster](#)]

- Reproduced paper from ACL | IJCNLP 2021 (Li, Xiang Lisa, and Percy Liang. “*Prefix-Tuning: Optimizing Continuous Prompts for Generation*”) in a team of three.
- Conducted four additional ablation studies on prefix tuning for LLMs. Noticed a threshold prefix length (15 to 20) after which accuracy declines in a small dataset setting. Identified a prefix initialization that led to 2.6, 4.0, 0.17 point increase in METEOR, ROUGE-L, and CIDEr metrics from SOTA.

### Drone: Navigating through Obstacles with Computer Vision

DEC 2022

*Introduction to Robotics* | [[video](#)]

- Programmed drone to navigate an obstacle course using computer vision for obstacle and destination recognition.

## HONORS & AWARDS

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- Sigma Xi Honor Society.
- Recipient of Peter and Rosalind Friedland Endowed Senior Thesis Fund 2022-23
- Election to **Tau Beta Pi** (top 1/5 of senior engineering class), 2022
- Independent Work Award, **Princeton Center for Statistics and Machine Learning** (awarded to 3 out of 124 students), 2022
- Election to **Tau Beta Pi** (top 1/8 of junior engineering class), 2021

## TALKS

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Student speaker at **CVPR Women in Computer Vision** workshop. *Perception, interaction and fairness: key components of visual recognition*. (Keynote speaker: Professor Olga Russakovsky; student speakers: **Nobline Yoo**, Angelina Wang and Sunnie S. Y. Kim). June 19, 2021.

## TEACHING & OUTREACH

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**Graduate TA** SEPT 2024–Present

**Princeton COS126 Computer Science: An Interdisciplinary Approach** | *Fall24, Spring25, Fall25*

- Led twice-weekly classroom sessions for students (sizes between 13-21) & graded assignments.

**Lead Research Instructor** JULY 2025, 2024, 2023, 2021, 2020 • JULY 2019–AUG 2019

**Princeton AI4ALL** | *3-week AI program for ~30 high-schoolers from underrepresented backgrounds*

- Lead Research Instructor in summer 2023-25; Research Instructor in previous summers.
- Led and set vision for instructional team on curriculum development with focus on hands-on learning, social impact, and ethical design in four core projects: (1-2) computer vision for accessibility and rainforest conservation, (3) natural language processing for mental health, (4) robotics for environmental monitoring.

**Undergraduate Course TA** SEPT 2022–MAY 2023

**Princeton Department of Computer Science** | *Advanced Programming Techniques*

- Graded semester-long projects for Advanced Programming Techniques (COS333).

**Individual and Group Tutor** OCT 2022–MAY 2023

**Princeton McGraw Center for Teaching & Learning** | *R Programming, POL345, SML201*

- Mentored students in R programming, quantitative social science, and data science in individual and group environments.
- Employed various teaching methods to tailor assistance to individuals to help solidify foundational knowledge and learn how to learn.

## WORK EXPERIENCE

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**Engineer/Scientist** AUG 2023–2024

**Johns Hopkins University Applied Physics Laboratory** | *Asymmetric Operations Sector*

- Developed computer vision models for effective medical triage.

**Software Development Engineer Intern** MAY 2022–AUG 2022

**Amazon AWS in Seattle, Washington** | *Supply Chain Organization*

- Built a configuration system to influence AWS' supply-demand matching.

**Open Access Repository Student Assistant** SEPT 2019 – MAY 2023

**Princeton University Library** | *Scholarly Communications Office*

- Identified faculty-authored Open Access articles and updated Princeton's Open Access Repository.

## OTHER PROJECTS

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**Computer Vision for Medical Triage in High-Noise Environments** NOV 2023–FEB 2024

**DARPA Triage Challenge** | **Johns Hopkins University Applied Physics Laboratory**

- Helping develop DARPA Triage Challenge.
- Developing computer vision models to detect hemorrhage and respiratory distress for effective medical triage in high-noise, diverse environments.

## ACTIVITIES

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**Johns Hopkins APL Women in Technology** AUG 2023–2024

**Princeton Women in Computer Science** SEPT 2019–MAY 2023

**Princeton Society of Women Engineers (SWE)** SEPT 2020 – MAY 2023

## SERVICE

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**COS G1 Mentorship Program** SEPT 2025–Present

Mentor

**AI Lab Student/Research Un-Conference** FEB 2025

Volunteer Room Lead (provided assistance for Spotlight Research Talks)

**Johns Hopkins APL ASPIRE Program** NOV 2023–JAN 2024

Mentor for high-school intern interested in STEM

**Princeton SWE High School Engineering Colloquium** APR 2023

Volunteer Panelist

- Mentored high-school girls interested in STEM by answering questions about Princeton's Engineering experience and giving advice.

**Princeton Kindred Spirit**

NOV 19, 2022

Volunteer Videographer

- Recorded Kindred Spirit acapella's fall arch sing.

**Princeton AI4ALL**

JULY 2022

Volunteer

- Provided guidance to the natural language processing research instructor team on transitioning from in-person to remote instruction and strategies to engage students, rooted in my experience as research instructor in summers 2019-2021.

**Princeton Nursery School**

SEPT 2–6, 2019

Volunteer

- Assisted daycare for preschoolers between ages 2½ to 5.
- Helped repaint and decorate indoor spaces, clean outdoor playground.

**SKILLS**

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- Languages: Python, Java, C, Javascript, HTML/CSS
- Frameworks/Packages: PyTorch, Tensorflow, Numpy
- Technologies: Unix, Git, Latex