

# Julian Ost

PhD Candidate, Princeton University

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## Research Interests

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Computer vision and computer graphics, with a focus on **3D scene generation**, **world models**, and **neural rendering** for autonomous driving and robotics — bridging simulation and perception through learned generative models of large-scale dynamic environments.

## Education

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### Ph.D. in Computer Science

*Princeton University, Computational Imaging Lab*

Princeton, NJ

2022 – present

- Advisor: Prof. Felix Heide
- Research on 3D scene generation, inverse neural rendering, and 3D perception with generative models

### M.Sc. in Robotics, Cognition, Intelligence

*Technical University of Munich (TUM)*

Munich, Germany

2018 – 2021

- Thesis: *Neural Scene Graphs for Dynamic Scenes* (Grade: 1.0 – highest)
- Advisor: Prof. Dr. Nils Thuerey
- Focus: Machine Learning, Computer Vision, Automatic Control

### B.Sc. in Mechanical Engineering

*Technical University of Munich (TUM)*

Munich, Germany

2014 – 2018

- Thesis: *Parametric Modelling of Rotor Inflow Conditions* (Grade: 1.0)
- Focus: Systems Theory, Automatic Control, Fluid Dynamics, Numerical Optimization

## Publications

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### 7. WorldFlow3D: Flowing Through 3D Distributions for Unbounded World Generation

[Julian Ost](#), Amogh Joshi, Felix Heide

*Preprint*, 2026.

[\[Project\]](#) [\[PDF\]](#)

### 6. ChopGrad: Pixel-Wise Losses for Latent Video Diffusion via Truncated Backpropagation

Dima Rivkin, Parker Ewen, Lingjie Gao, [Julian Ost](#), Simon Walz, Rohan Kangutkar, Mario Bijelic, Felix Heide

*Preprint*, 2026.

[\[Project\]](#) [\[PDF\]](#)

### 5. LSD-3D: Large-Scale 3D Driving Scene Generation with Geometry Grounding

[Julian Ost](#), Andrea Ramazzina, Amogh Joshi, Mario Bömer, Mario Bijelic, Felix Heide

*AAAI Conference on Artificial Intelligence (AAAI)*, 2026.

[\[Project\]](#) [\[PDF\]](#)

4. **VERDI: VLM-Embedded Reasoning for Autonomous Driving**  
Bowen Feng, Zhipeng Mei, Julian Ost, Federico Ghilotti, Bingchen Li, Ricky Girgis, Aniket Majumdar, Felix Heide  
*Preprint*, 2025. [\[Project\]](#) [\[PDF\]](#)
3. **Towards Generalizable and Interpretable Three-Dimensional Tracking with Inverse Neural Rendering**  
Julian Ost, Tanushree Banerjee, Maolin Mao, Mario Bijelic, Felix Heide  
*Nature Machine Intelligence*, 7, 1322–1330, 2025. [\[Project\]](#) [\[PDF\]](#)
2. **Neural Point Light Fields**  
Julian Ost, Issam Laradji, Alejandro Newell, Yuval Bahat, Felix Heide  
*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.  
[\[Project\]](#) [\[PDF\]](#)
1. **Neural Scene Graphs for Dynamic Scenes**  
Julian Ost, Fahim Mannan, Nils Thuerey, Julian Knodt, Felix Heide  
*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021. **Oral Presentation.** [\[Project\]](#) [\[PDF\]](#)

Author name underlined indicates self.

## Professional Experience

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### Individual Contributor

*Torc Robotics*

Remote  
*Apr 2025 – present*

- Technical lead of the Data Driven Simulation team; strategy and development of a neural rendering-based simulation pipeline for multimodal training and validation data generation.

### Machine Learning Engineer

*Algolux*

Munich, Germany  
*May 2021 – Aug 2022*

- Strategy development of a neural rendering-based simulator as the foundation for a new Data Driven Simulation team.
- Continued research on neural rendering for large-scale autonomous driving scene reconstruction under the supervision of Felix Heide.

### Computer Vision Intern

*Algolux*

Munich, Germany  
*Oct 2019 – Apr 2021*

- Development and implementation of the first neural rendering model for autonomous driving scenes (Neural Scene Graphs).
- Deep learning-based object detection and neural rendering under the supervision of Felix Heide and Fahim Mannan.

## Teaching

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### COS 324: Introduction to Machine Learning

Graduate Teaching Assistant, Princeton University

Fall 2024

### COS 429: Introduction to Computer Vision

Graduate Teaching Assistant, Princeton University

Spring 2024

## Awards & Honors

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- **Outstanding Reviewer Award**, ECCV 2024
- **Outstanding Reviewer Award**, CVPR 2023

## Academic Service

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### Conference Reviewing

Vision: CVPR (2025, 2024, 2023), ICCV (2025, 2023), ECCV 2024  
Machine Learning: NeurIPS (2025, 2024, 2023), ICLR 2023, AAAI 2026  
Graphics: SIGGRAPH 2026, SIGGRAPH Asia 2023, Eurographics 2025

### Workshop Presentations

ICCV 2021 Workshop on Learning 3D Representations for Shape and Appearance – Poster & Breakout Session

## Skills & Languages

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Programming: Python, PyTorch, TensorFlow, C/C++, MATLAB/Simulink  
Languages: English (fully proficient), German (native)

## Other Activities

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### TUfast Eco Team

*Technical University of Munich*

Munich, Germany

*2015–2018*

- Development of autonomous and efficient prototype vehicles in a cross-departmental student team.
- Path control and state estimation using Kalman Filters; dynamic simulation for control and path planning.
- Exterior design, CFD simulation, and manufacturing for efficient vehicle prototypes.