Department of Computer Science & Engineering – 2025 -2026 Seminars

ΟΜΙΛΙΑ

“ Physics-Based Embodied Visual Intelligence ”

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ABSTRACT

There is solid empirical evidence that both geometric and semantic visual representations are crucial for executing actions in embodied intelligent systems. Thus, solving visual perception is a pressing need, as the large-scale deployment of such intelligent systems can greatly benefit humanity, e.g. through autonomous vehicles or robotic home assistants. However, the Physics-agnostic data-driven approach taken by the vast majority of recent works on visual perception exhibits fundamental limitations in generalization, often yielding physically infeasible and inaccurate outputs. By contrast, in this talk I will advocate for a hybrid, data-driven yet Physics-informed approach to embodied visual intelligence. This approach embraces the well-proven representational power of generic parametric neural network mappings, while at the same time it organically integrates fundamental principles of optics and radiometry in the learning. In this way, we can inject physically valid inductive biases to the learned models and grant them broader capability of generalization. The merit of our Physics-based regime will be empirically supported by showing it in action in a range of exemplary works of ours on visual perception, which address the representative problems of metric 3D depth estimation, inverse rendering, and multi-sensor fusion for semantic segmentation and neural reconstruction.

Short Bio: *Dr. Christos Sakaridis is a Lecturer at ETH Zürich, where he leads the Artificial Visual Intelligence group (AVI) under the umbrella of the Photogrammetry and Remote Sensing lab of Prof. Konrad Schindler. His broad research fields are Computer Vision, Artificial Intelligence and Machine Learning, while the focus of his research is on 3D and semantic visual perception and on embodied settings such as autonomous cars and robots. At AVI, he is the Principal Investigator of TRACE, a large-scale project on Computer Vision and Artificial Intelligence funded by Toyota Motor Europe. He has taught Master courses on the topics of Computer Vision, AI, and autonomous cars at ETH, University of St. Gallen, and University of Zurich. He has authored 51 peer-reviewed publications, holds 12 patents, and has received the ETH Zürich Career Seed Award. From 2021 to 2025, he was a Senior Researcher at Computer Vision Lab of ETH with Prof. Luc Van Gool. He obtained his PhD from ETH Zürich and Computer Vision Lab in 2021. Prior to that, he received his MSc in Computer Science from ETH Zürich in 2016 and his Diploma in Electrical and Computer Engineering from National Technical University of Athens with first-class honors in 2014, supervised in his Diploma thesis by Prof. Petros Maragos.*

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