



# Department of Computer Science

## Deep Learning for Structure-Aware Geometry Processing

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Adobe Research

Hosted by Dr. Przemyslaw Musialski

**DATE:** Wednesday, April 7, 2021

**TIME:** 2:30 PM – 3:30 PM

**LOCATION:** <https://njit.webex.com/njit/j.php?MTID=m2c55269d40dcfcc2de3e107dd23b2f42>

[web.njit.edu/cs/CS\\_Seminar/](http://web.njit.edu/cs/CS_Seminar/)

**Abstract:** In geometry processing, deep learning is used to reconstruct shapes from point clouds or images, to generate new shapes from a given shape distribution, or to edit shapes efficiently, among other applications. One central open question in this domain is the choice of shape representation. Most frequently, existing geometry processing methods use voxel grids, point clouds, and more recently occupancy fields and signed distance functions as shape representation. However, these low-level representations are quite dissimilar to the way we humans perceive shapes. Often, we perceive shapes as a composition of well-known parts or primitives. A chair, for example, may be a composition of legs, a seat, a backrest and sometimes a pair of armrests. I am going to present some projects we have been working on that use such a 'structural' representation of shapes: a composition of parts, just like the chair, with additional geometric relationships between the parts. In these projects, we have shown that using such a structural representation has several advantages over more traditional low-level representations, such as better reconstruction, generation, and editability of shapes.

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**Bio:** Paul Guerrero is a research scientist at Adobe, working on the analysis of shapes and irregular structures, such as graphs, meshes, or vector graphics, by combining methods from machine learning, optimization, and computational geometry. He completed his PhD at the Institute for Computer Graphics and Algorithms, Vienna University of Technology, and at the Visual Computing Center in KAUST. Prior to his current position, Paul worked as a Post-Doc at University College London, and as a visiting Post-Doc at KAUST and Stanford University.