Advanced GPU Computing + Visualization for 3D Learning

- Culmination of the GPU-Accelerated Computing and Visualization Certificate track course series
- Builds on foundations established in prior GPU-Compute and SciVis classes
- Specify, design, program, analyze, and optimize a complete application which uses integrated GPU computing (CUDA) and GPU-accelerated visualization (OpenGL)
- Learn to use advanced GPU hardware capabilities: tensor cores, ray tracing cores

- Focus on SOTA 3D learning-based GPU applications:
  - 3D object/surface reconstruction and generation
  - NeRF and 3D Gaussian Splat GPU implementation
  - 3D Point Cloud reconstruction and understanding

- Hands-on project-oriented curriculum.
- *Class grade based on homework + project effort.*

- Proficiency in CUDA and OpenGL programming required. This course will not introduce these APIs and assumes students can immediately begin implementing CUDA compute kernels and OpenGL vertex and fragment shaders. (*prerequisites of UW PMP GPU-Compute and SciVis courses or equivalent*)
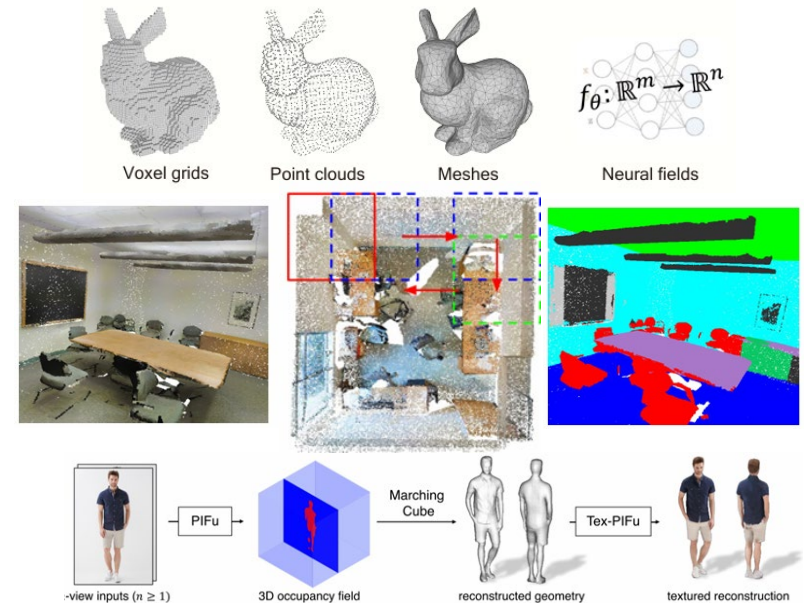

Image credits (top down): Shi et al, *3D Generative models: a survey*, arXiv (2023); 3dsemantics.Stanford.edu (2017); Saito et al., *PIFu*, ICCV (2019).

C/C++ coding intensive!