UNITY CALL FOR PROPOSALS:

NOVEL VIEW SYNTHESIS & EXTRACTING CANONICAL MESHES & MATERIALS FROM IMPLICIT ML REPRESENTATIONS

At Unity we believe the world is a better place with more creators in it and our mission is to help create those creators. Unity Content division aims to build a new generation of content creation tools that make it easy for users to scan surface materials and 3D objects from the real world and to clean-up, modify or even totally reimagine those assets through an ML assisted artistic workflow. With respect to scanning real world objects, we believe there's an opportunity around ML to make the scanning process simpler and more foolproof for novices. In order to deliver on our mission and offer our users a faster, easier, and better way to scan, we want to focus our research around novel view synthesis and extracting canonical meshes and materials from implicit ML representations.

Unity is pleased to invite faculty to respond to this call for research proposals. In order to support academic work that addresses our challenges and opportunities while producing generalizable knowledge,
Unity is pleased to offer three research awards of $25,000. Awards will be made as unrestricted gifts to the principal investigator's host university. Awardees will be invited to present and engage in discussion with researchers at Unity.

Suggested Research Themes:

- **Speed-up:** In order to scale, we must investigate ways to speed up training. NeRF-like algorithms (and their SDF counterparts) train for many hours. There are a few recent advances in this space towards rapid convergence that we can build on (examples: advanced in better coordinate-based initialization schemes, meta-learning…)

- **Latent encoding property disentanglement:** We want to work our way backwards to scene properties from the "hidden" neural representation - that is, in one way or another, we want to make sure the implicit representation is trained in a way that will make the post-processing to a canonical form easy. In simple terms, we want to extract PBR-like parametrization and/or mesh-like geometry from the rich latent space during post-processing. This still doesn't have to amount to a real-time canonical form - but be a provably disentangled representation of the latent encoding. (a naive example would be multiple NeRF-like volumes, holding albedo, roughness, normal, etc. information per volume)

- **Path to real-time:** Largely dependent on the latent disentanglement step - we want to post-process the resulting intermediate representation into an asset we can import into Unity (or subsequently drop into downstream editing tools). (naive example: marching cubes on thresholded density differential in NeRF ...)

For more details and a link to apply, please contact: academia.research@unity3d.com