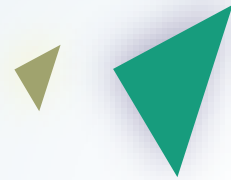




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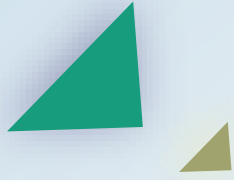
Brunton, Alan (Fraunhofer IGD)
Abu Rmaileh, Lubna (Fraunhofer IGD / NTNU, Norway)

»Displaced Signed Distance Fields for Additive Manufacturing«

ACM Transactions on Graphics (TOG) 40, no. 4 (2021): 1-13

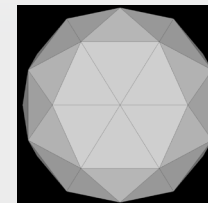
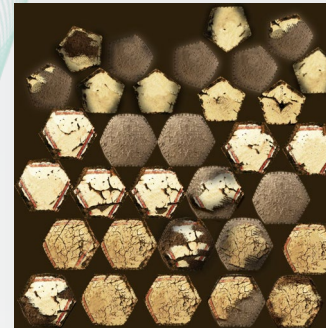
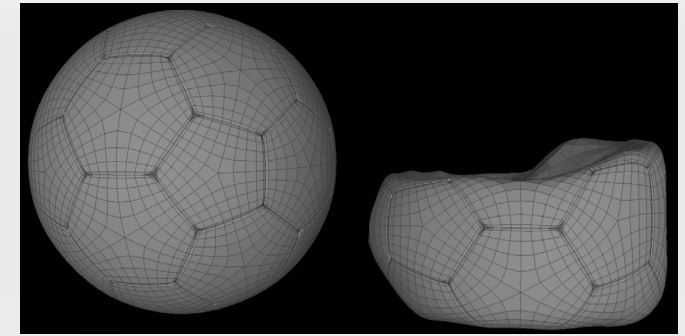
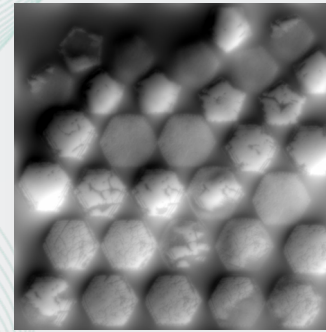
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PROBLEM

- Displacement maps are a compact well established method for modeling meso-scale surface details
- For 3D-printing details have to be modeled explicitly resulting in excessive storage, transmission and processing costs
- How to efficiently integrate Displacement Maps into the 3D printing process in order to
 - produce highly detailed surfaces from low-polygon meshes with an attached displacement map
 - produce smooth surfaces from low-polygon meshes of higher order primitives?



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RESULT

- Novel unified implicit representation for displacement maps
- Novel algorithmic framework for printing 3D objects represented using displacement maps
- Fully integrated into existing 3D printer driver (Cuttlefish®)



USP

- The novel implicit representation
 - supports unbounded displacement and performs no further tessellation or refinement
 - robustly handles incomplete, non-manifold and selfoverlapping input
 - algorithmically efficient



Explicit Subdiv. 5:
5,48MB



Explicit Subdiv. 5:
1382.75 MB



Implicit: 4.25 MB



without displacement



with displacement

