

# 3D INPAINTING VIA OSMOTIC FLOW OF DIFFERENTIAL COORDINATES

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Digitalized archaeological finds and fragments are used for preservation, accessibility, enhanced analysis, visual representation as well as blueprints for restoration efforts. Elaborating fragments digitally, archaeologists can, for example, virtually piece together the artifact's complete form.

The initial artifact reconstruction presumably contains multiple types of damage, apart from the fractures between individual fragments. Typically, inpainting is the editing tool used for correction of corrupted regions of the mesh.

This work proposes a novel approach to 3D mesh inpainting, which combines the deformation capacity of the PDE Osmotic-flow [1], with the shape representational power of the differential coordinates [2]. The osmotic-flow applied to intrinsic shape descriptors allows to smoothly recover the internal damaged region, producing healed shape reconstruction.

The preliminary result offer a promising direction for various archaeological, scientific and engineering applications.

## References

- [1] J. Weickert, K. Hagenburg, M. Breuß, O. Vogel, *Linear Osmosis Models for Visual Computing*. In: A. Heyden, F. Kahl, C. Olsson, M. Oskarsson, XC. Tai. (eds) *Energy Minimization Methods in Computer Vision and Pattern Recognition. EMMCVPR 2013. Lecture Notes in Computer Science*, vol 8081. Springer, Berlin, Heidelberg, (2013), pp. 26–39.
- [2] M. Huska, S. Morigi, G. Recupero, *Geometric texture transfer via local geometric descriptors*, *Applied Mathematics and Computation*, 451 (2023), 128031.