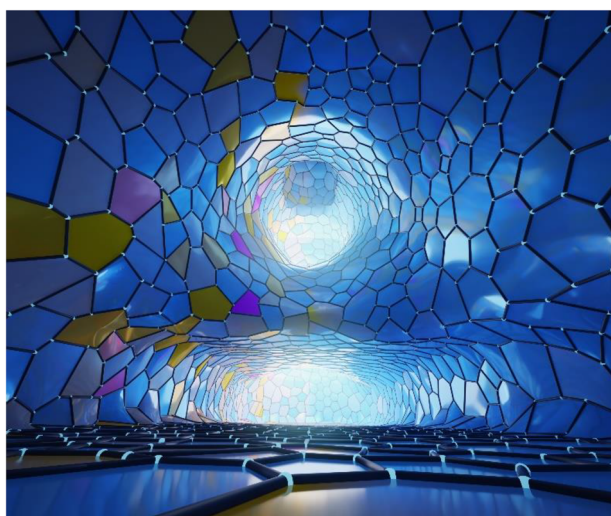# 2024 Cover Image

Polygon Laplacian Made Robust

Polygon Laplacian Made Robust by Dennis R. Bukenberger

Description: This image shows the inside of the teaser figure 'fertility' from Polygon Laplacian Made Robust [1]. It visualizes the condition numbers of individual polygon stiffness matrices. The mesh transitions from the input mesh to our result from left to right. The original mesh features disfigured polygons with alarming (yellow) or terrible (magenta) condition numbers. With our tailored smoothing algorithm, polygons become very regular and, combined with our improved polygon Laplacian, result in better condition numbers (blue) and improved robustness in computational simulation. Blender was used to stylize the geometry and render the image.

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Author bios:

Dennis R. Bukenberger received his doctoral degree in computer science from the University of Tübingen in 2021. As a postdoc at TU Dortmund, he continued his work on meshing techniques utilizing Voronoi diagrams and developed optimization methods for meshes in computational simulations. Currently, his research at TU Munich, in collaboration with TU Delft, is focused on improving the structural compliance of mesh structures for future use in sustainable manufacturing techniques.

Reference

Bunge, A., Bukenberger, D. R., Wagner, S. D., Alexa, M., Botsch, M. (2024) Polygon Laplacian Made Robust. *Computer Graphics Forum 43*(2).