

# HIGHLIGHT

Aachen,  
November 15, 2012

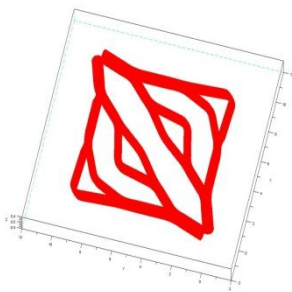


Figure 1: Improved design skeleton with optimal configuration and vessel node positions.



Figure 2: Branching 3D vessel structure.

## Design specification of the vascular system

The original “sandwich structure” concept for vessel systems includes such unnatural features as straight and long, completely parallel capillaries. The concept was revised and a more viable and nature-like solution is proposed – the “corner-to-corner” configuration, which allows the whole of the rectangular skin patch to be provided with nutrients.

The optimum values for vessel node positions and vessel diameters were modeled, and a model skeleton was created (with addition of Bézier smoothing near the vessel bifurcations). These specifications will be used to create improved CAD models of the design. In the future, more detailed analysis of the local structures (especially optimal branching conditions) will be performed and the results will be implemented in the current model.

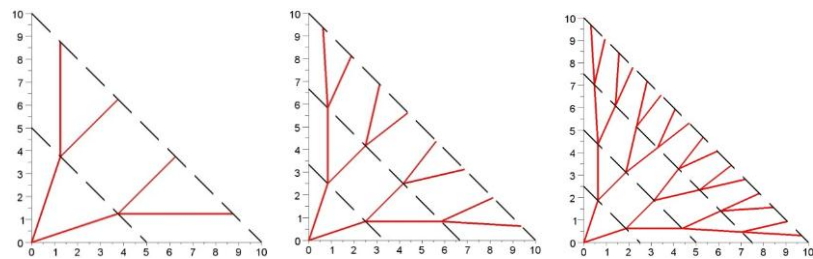


Figure 3: The distribution of vessel nodes.

In addition to the more topical planar vessel system design for two-dimensional skin patches, a brief preview into three-dimensional complex vascular modeling is presented as well.



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