

Supplementary

Design of Trabecular Bone Mimicking Voronoi Lattice-Based Scaffolds and CFD Modelling of Non-Newtonian Power Law Blood Flow Behaviour

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1. Comparison of Parasolid Binary files and Jupiter Tessellation (JT) CAD files

Table S1. File sizes of Parasolid Binary (x_b) and JT CAD files.

Voronoi Scaffolds	x_b File (MB)	JT file (MB)
V90	53.9	36.1
V85	96.3	64.7
V80	141	93.8
V75	196	130
V70	261	173

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2. Mesh Independence Test and Residual Convergence

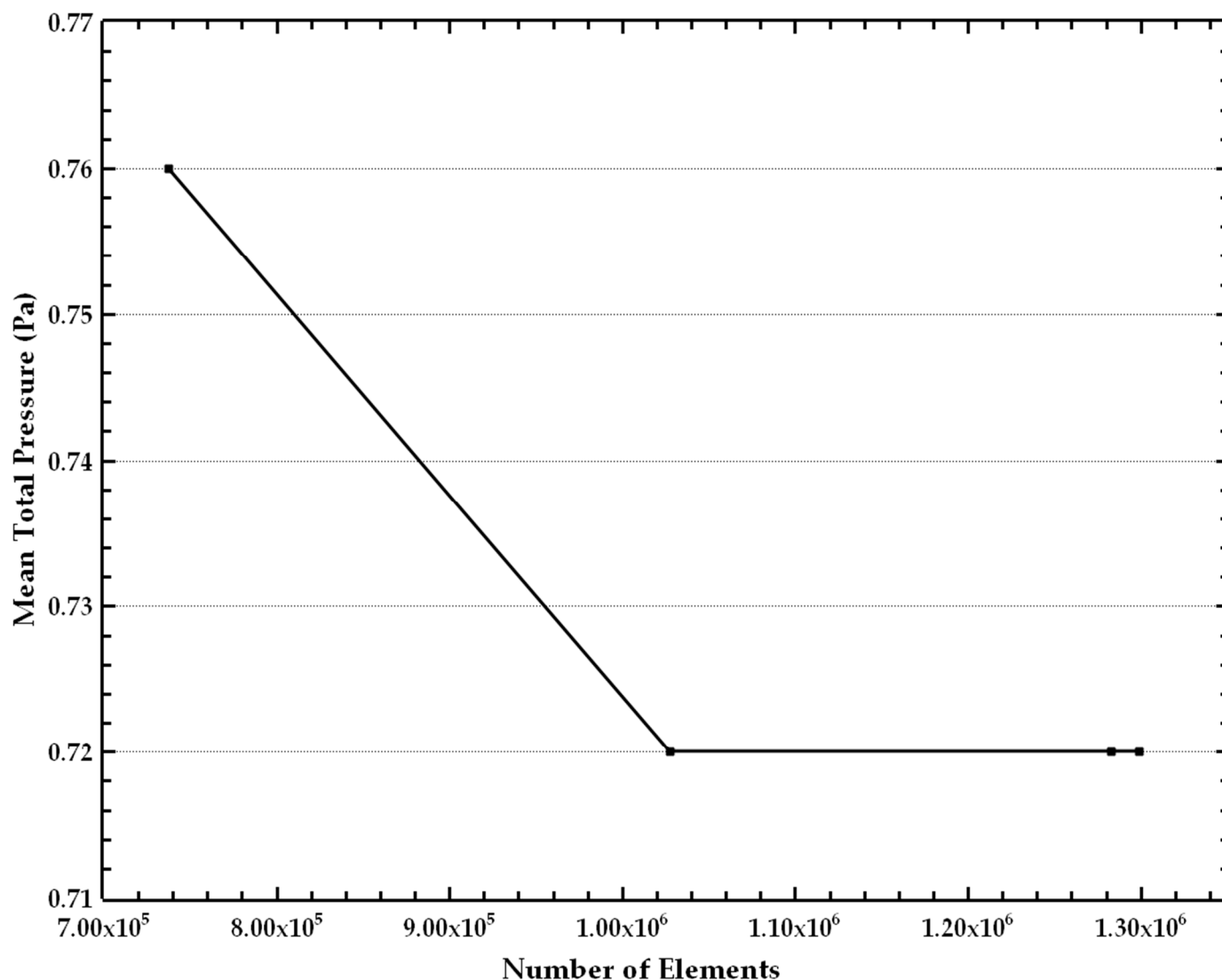


Figure S1. Mesh independence study for the CFD model of V90 Scaffold.

Meshing is a process of dividing the given domain into a number of elements. A finer mesh gives more accurate results. But it comes with the cost of high computation time. The mesh independence or mesh convergence test is performed to balance the accuracy of results and computation time. The predicted quantity doesn't change the value, even if the element size is changed (**Figure S1**). Thus, the motive of the mesh independence test is to achieve the converged result irrespective of element size. Residual values are one of the primary indicators of the convergence of iterative solutions. They calculate the local imbalance between input and out quantities given in a control volume. The lower residual values indicate that the results are more accurate (**Figure S2**).

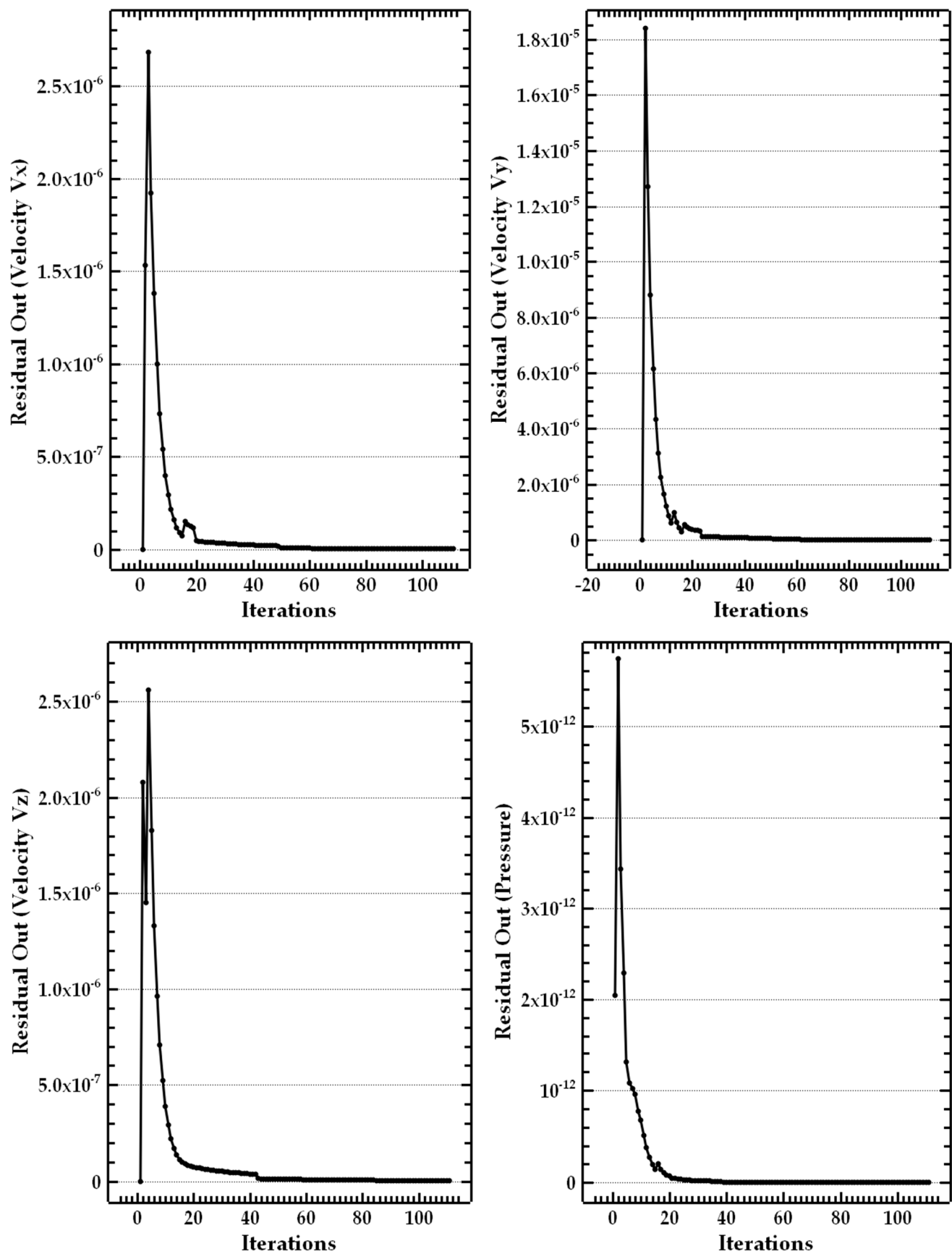


Figure S2. Residual convergence of steady state simulation for the CFD model of V90 scaffold at an inlet velocity of 0.7 mm/s using a monotone streamline upwinding scheme of FE solver.

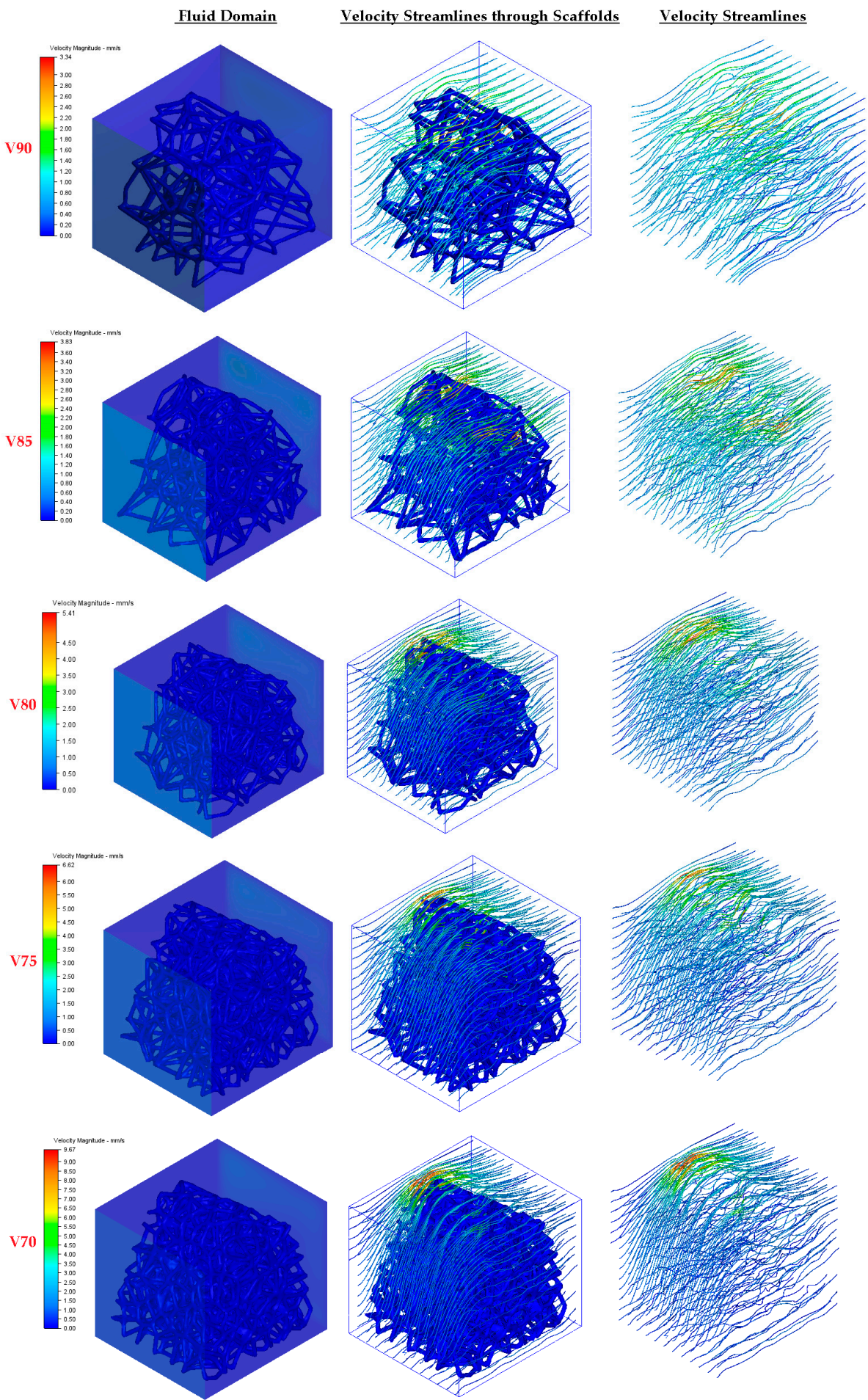


Figure S3. Velocity Contours for all CFD models**3. Meshing Parameters****Table S2.** Meshing Parameters

Parameters	Values
Mesh size	0.1 mm
Number of wall layers	3
Layer Factor	0.45
Layer Gradation	Auto
<u>Size refinement</u>	
i.) Resolution factor	1
ii.) Edge growth rate	1.1
iii.) Minimum points on edge	2
iv.) Points on longest edge	10
v.) Surface limiting aspect ratio	20
Volume growth rate	1.35