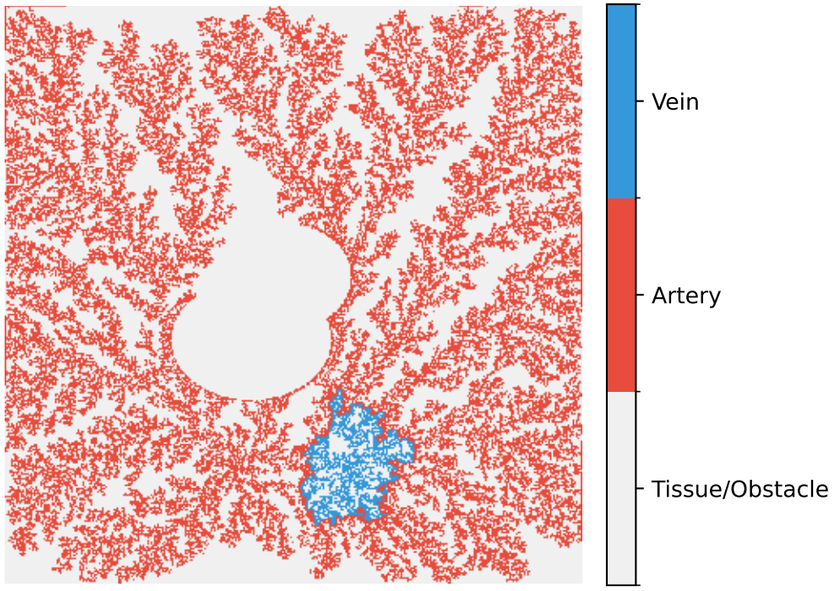
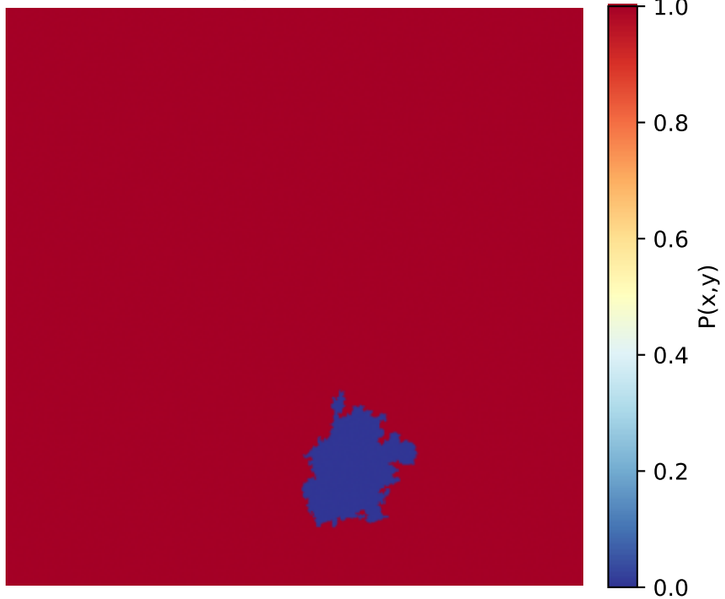
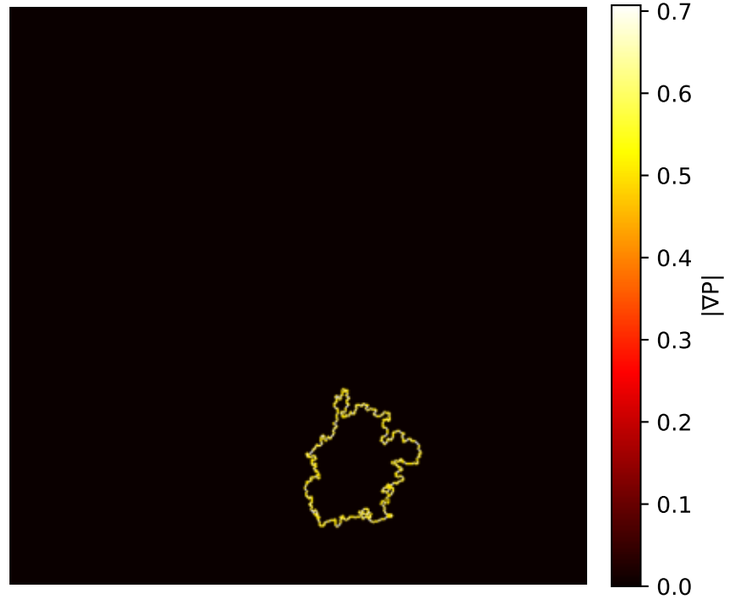
Final Vascular Structure
(Red: Artery, Blue: Vein)



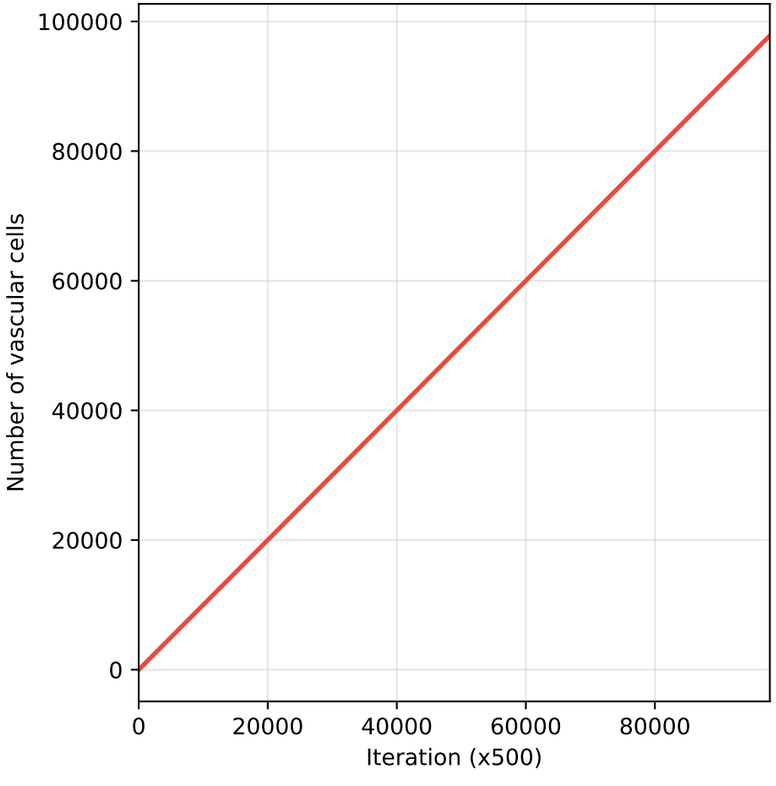
Final Pressure Field
(∇²P = 0, BC: Neumann)



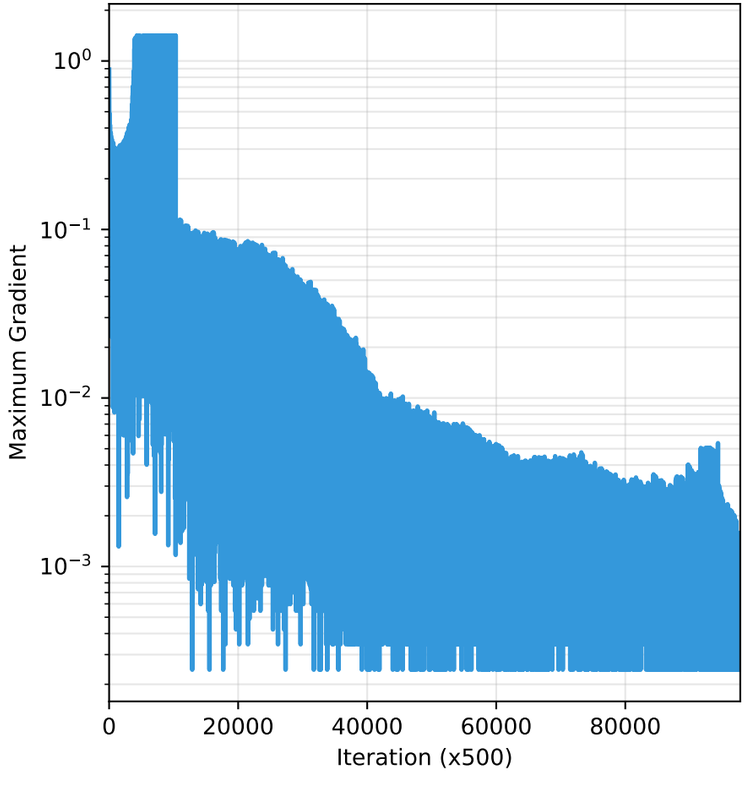
Magnitude |∇P|
(shear stress)



Vascular Network Growth



Pressure Field Dynamics

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MODEL CONFIGURATION
Grid: 512×512
Backend: CUDA (GPU)
Equation: ∇²P = 0  (Laplace)
Boundary Conditions:
  • P = 1.0 (arteries)
  • P = 0.0 (veins)
  • ∇P·n = 0 (Neumann)
Obstacles:
  • Two internal random ellipses (no vessel growth)
Growth Prob.:
  p_i ∝ |∇P|^1.5
Type rule (original):
  • New vessel copies type of neighbor with max P
Statistics:
  Iterations: 97816
  Vessels: 97818
  Fraction: 37.31%
  Time: 2884.96s
  Speed: 34 iter/s
References:
  • Niemeyer et al. (1984)
  • Fleury & Schwartz (1999)
```