Supplementary Material

Single-Layer Stokes Model Results

In this supplementary material, we have included additional plots of the shear stress experienced by the endothelium for the single-layer Stokes model which were omitted from the paper for brevity.

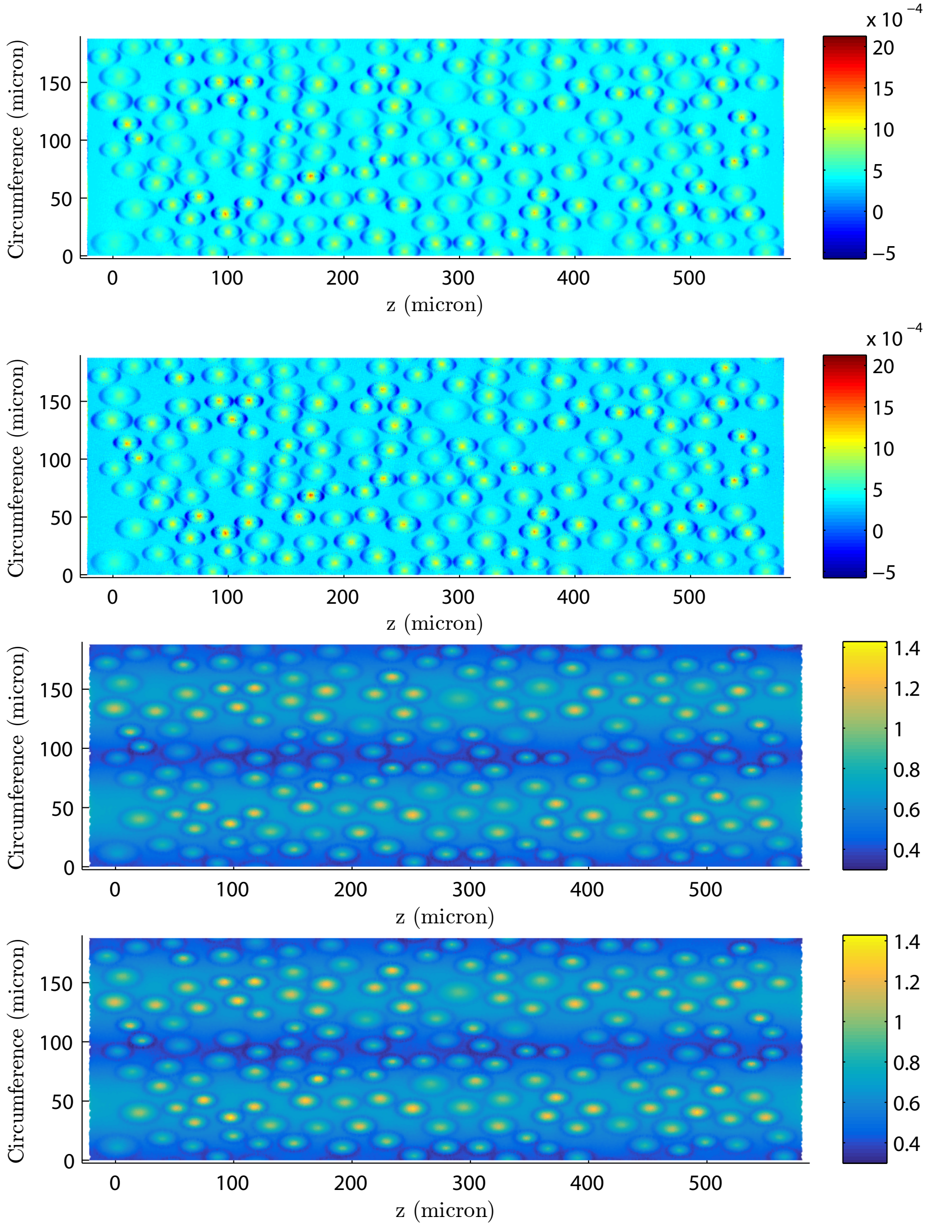

Figure 1: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

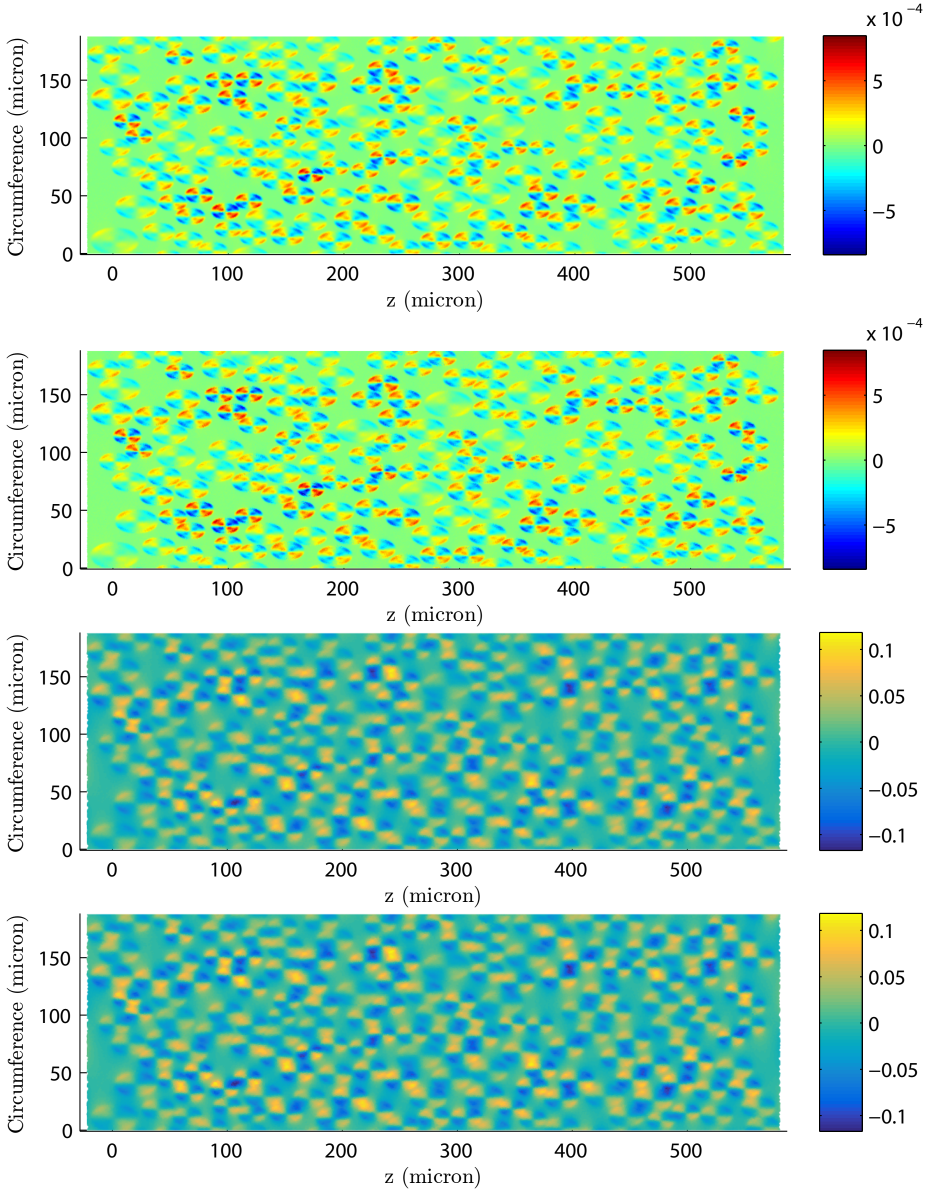

Figure 2: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\text{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

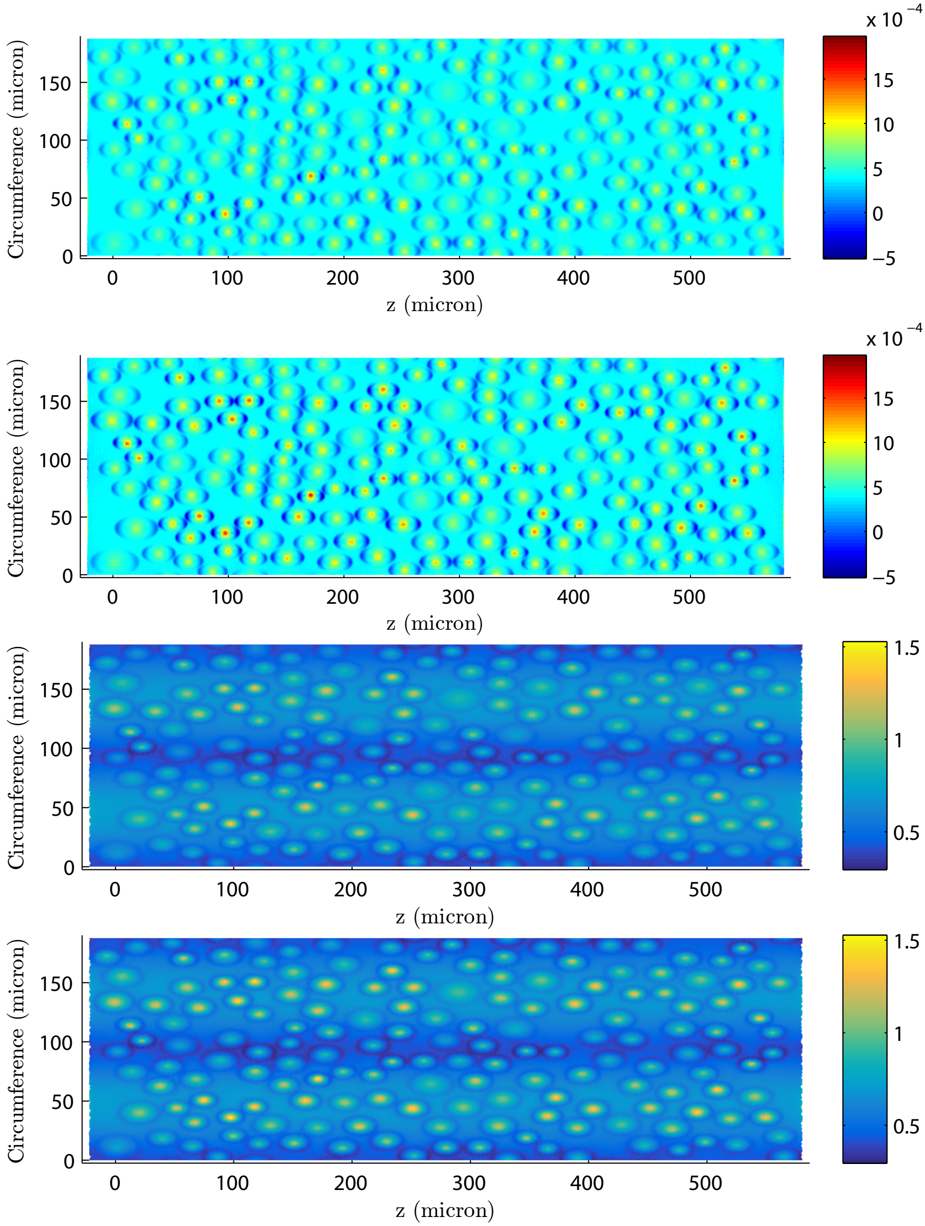

Figure 3: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

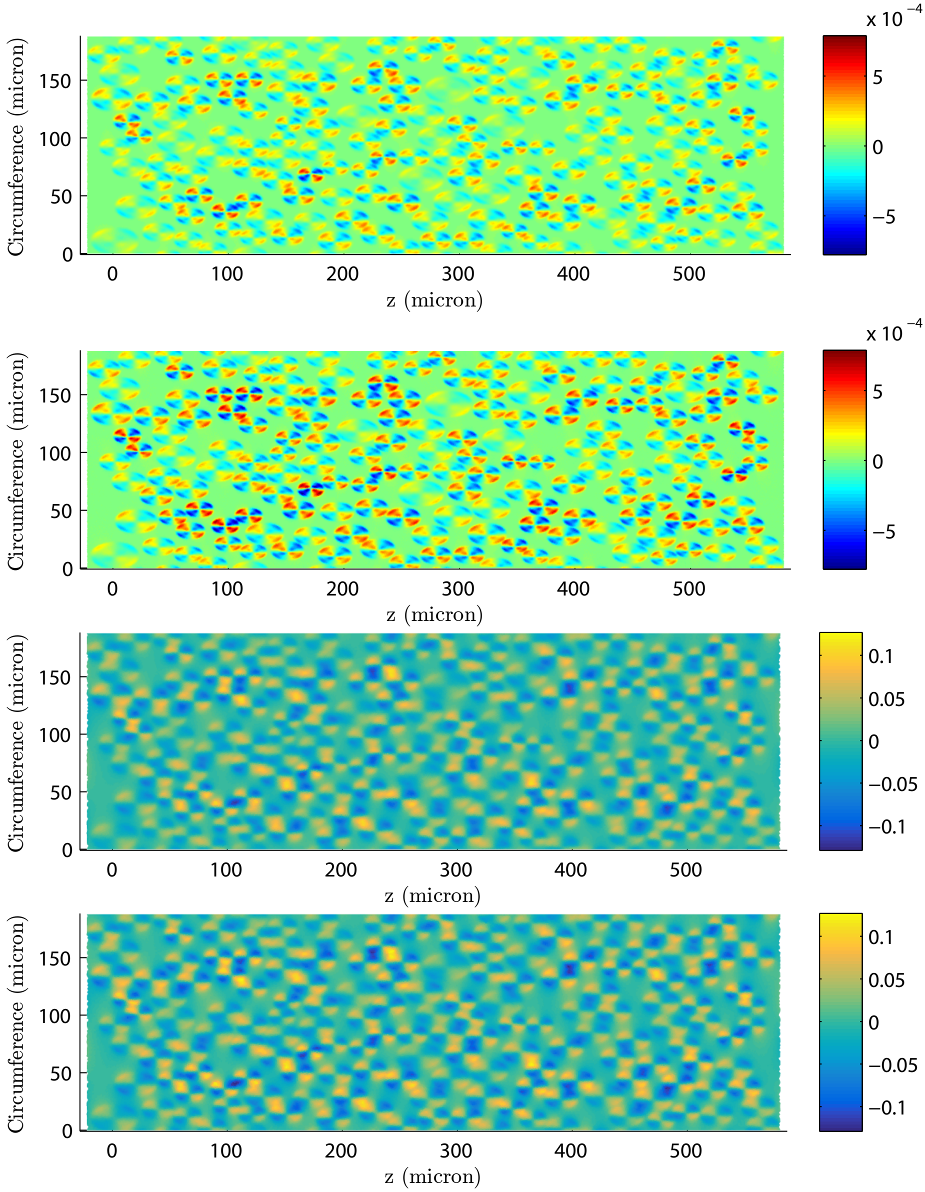

Figure 4: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

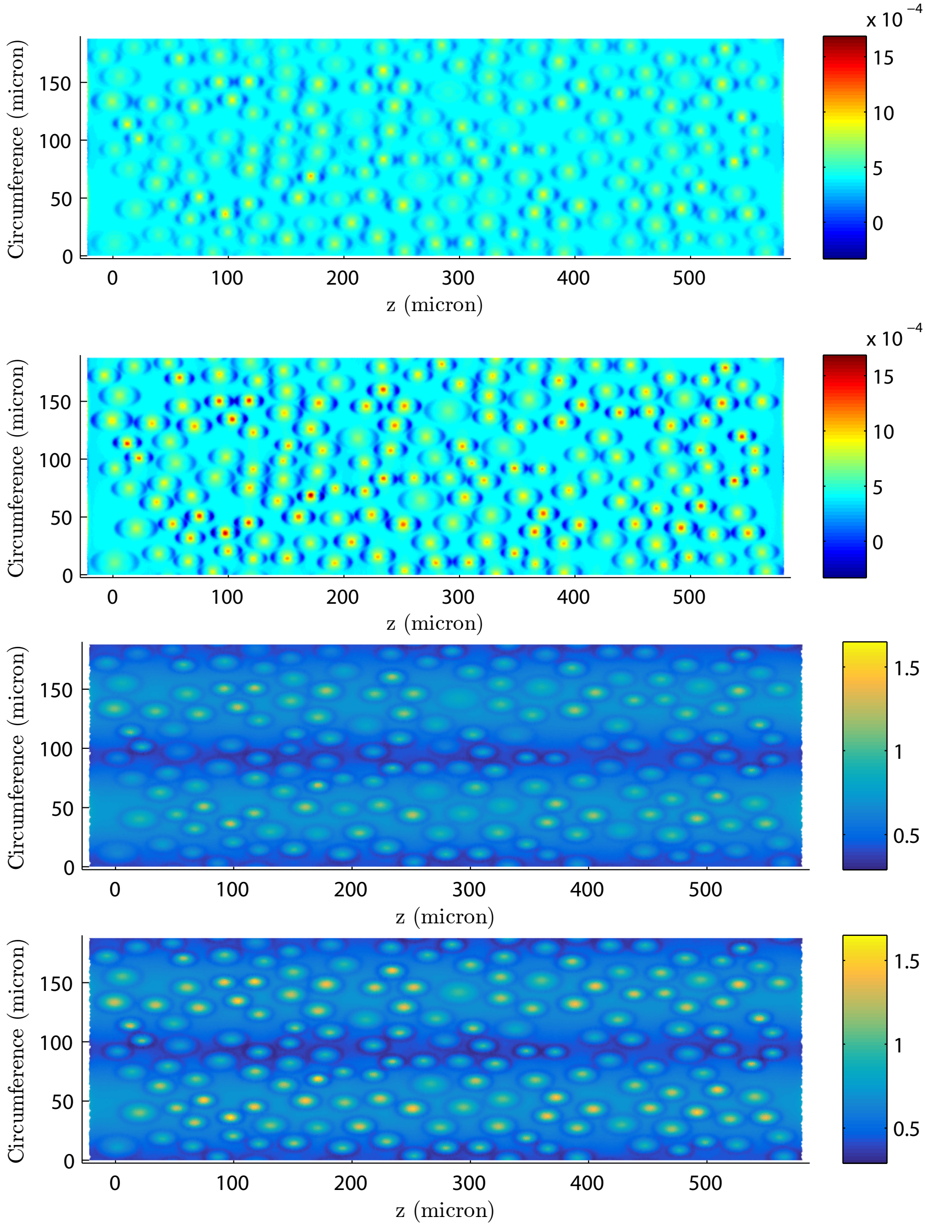

Figure 5: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

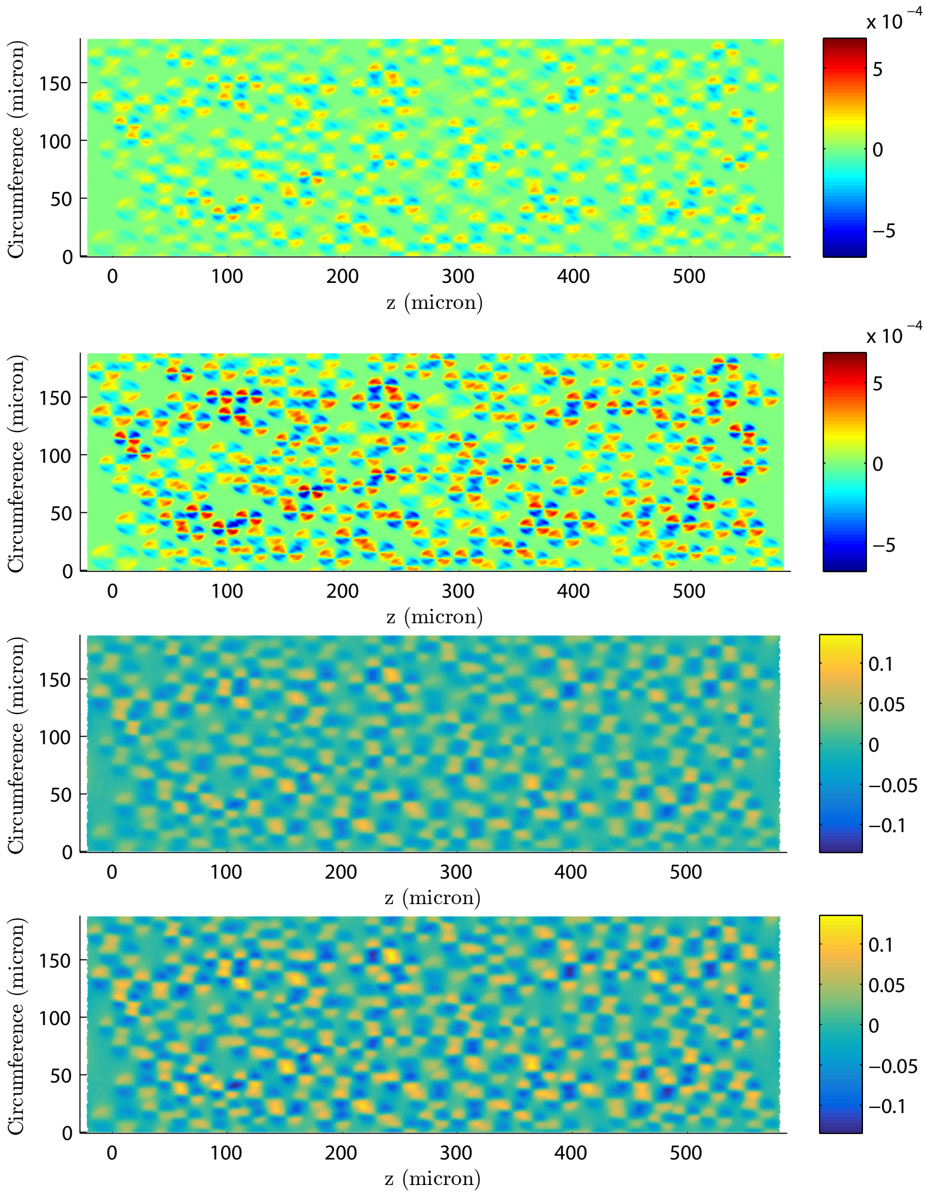

Figure 6: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

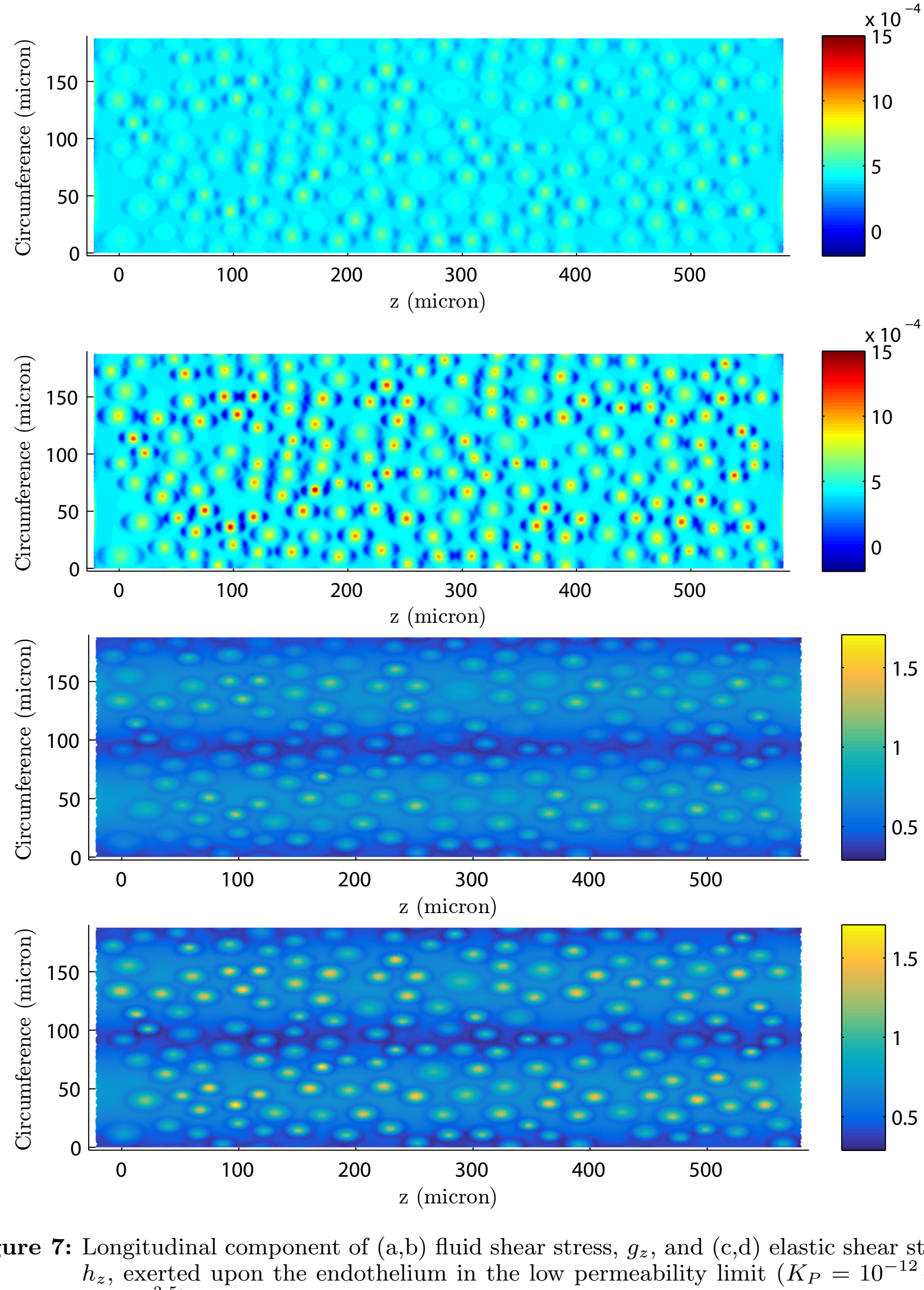

Figure 7: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1.5$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

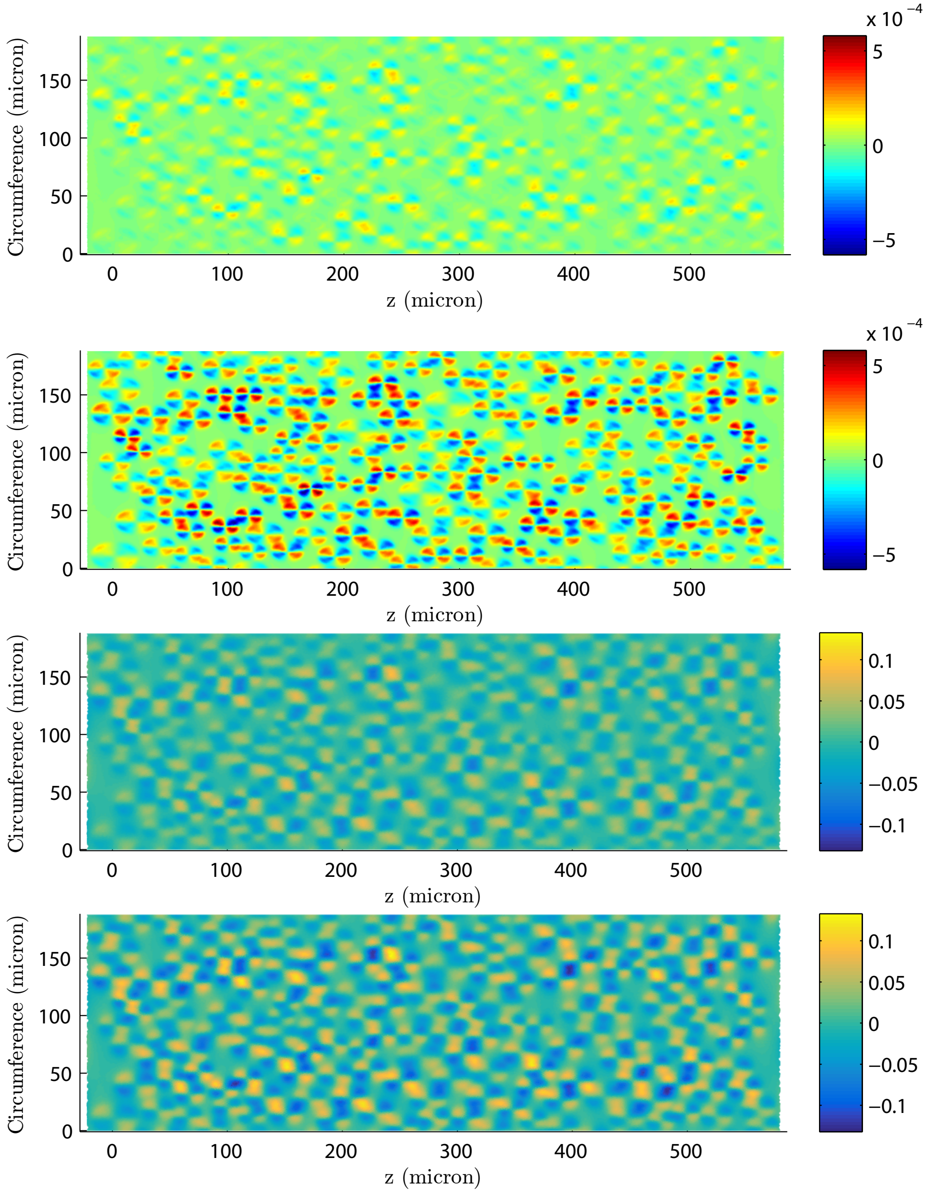

Figure 8: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1.5$, $\alpha_0 = 1.8$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

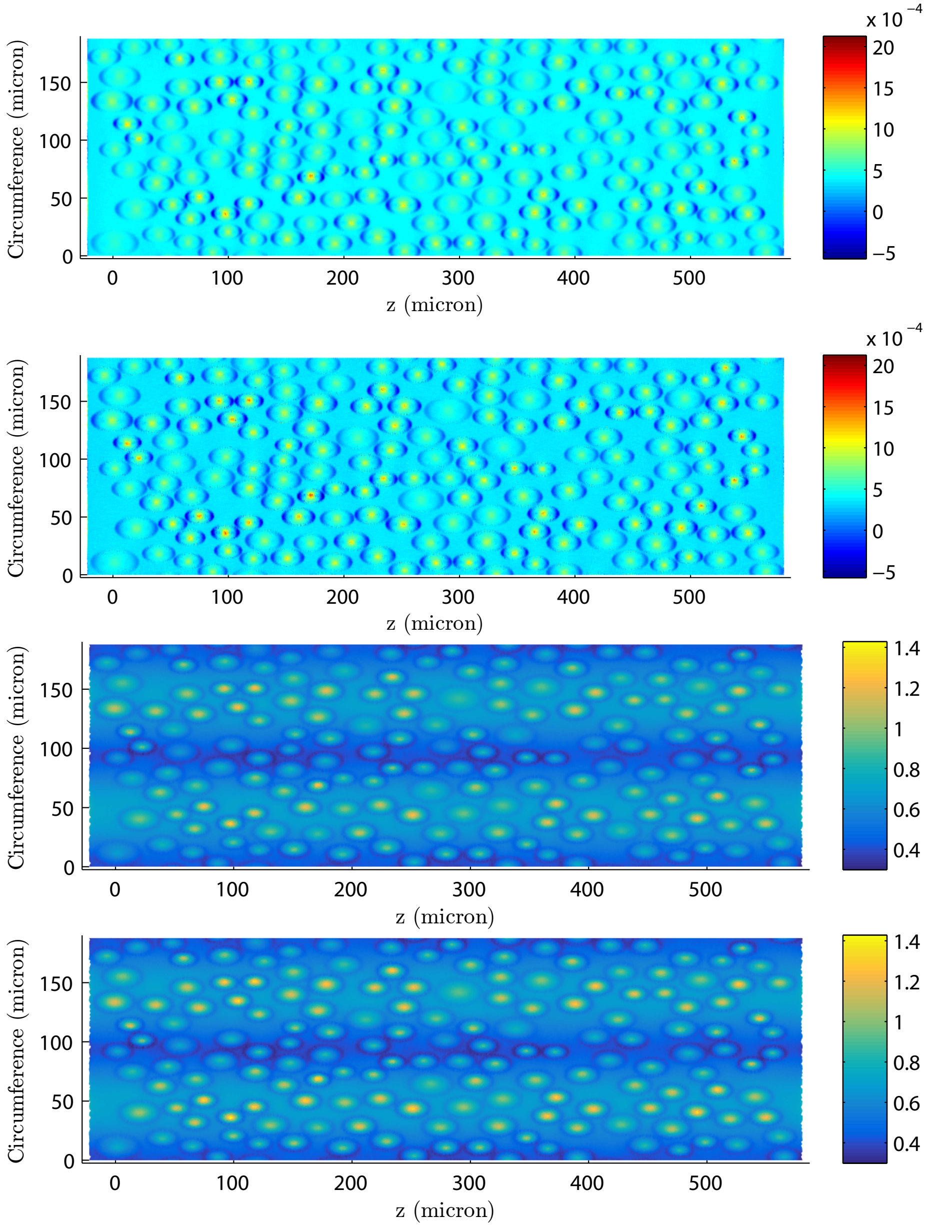

Figure 9: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

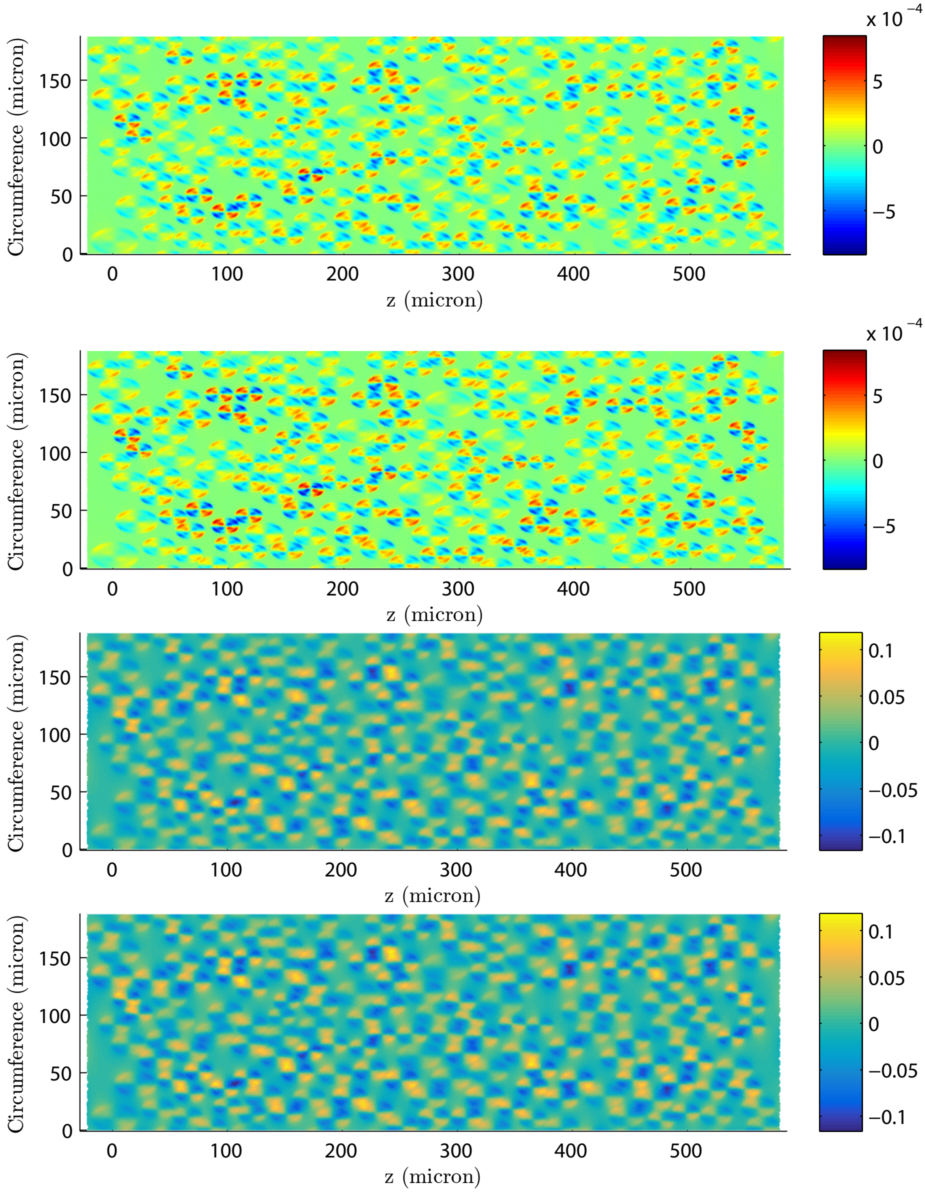

Figure 10: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

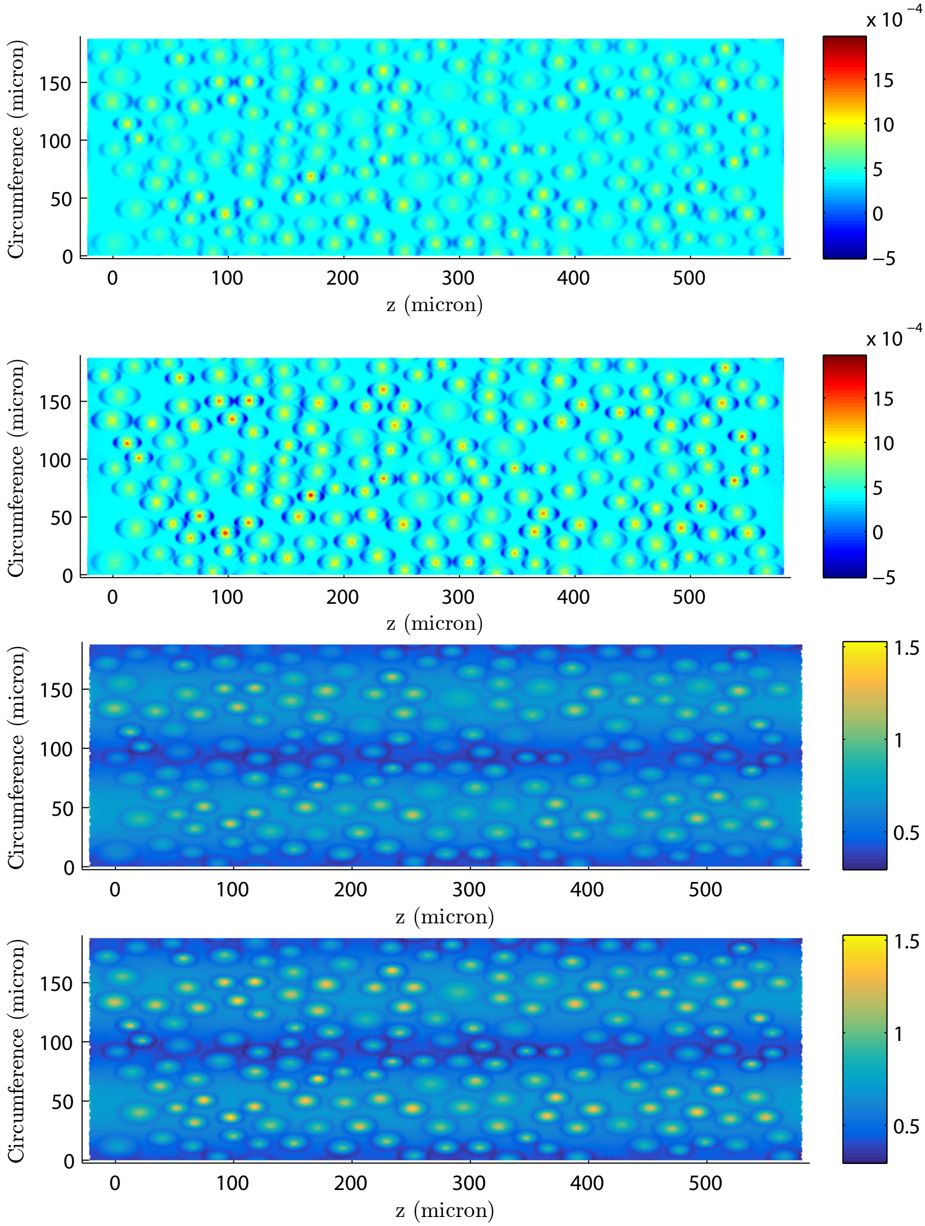

Figure 11: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

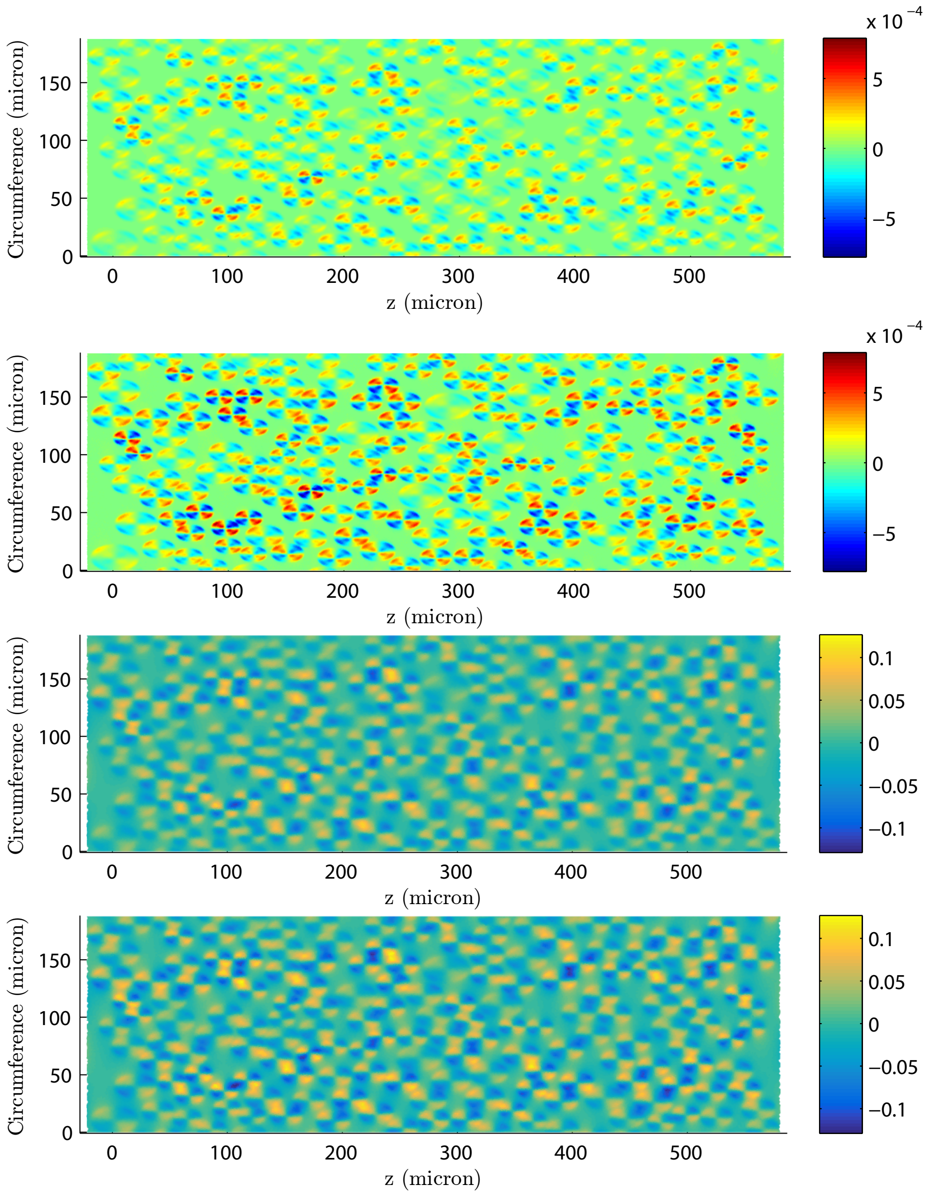

Figure 12: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

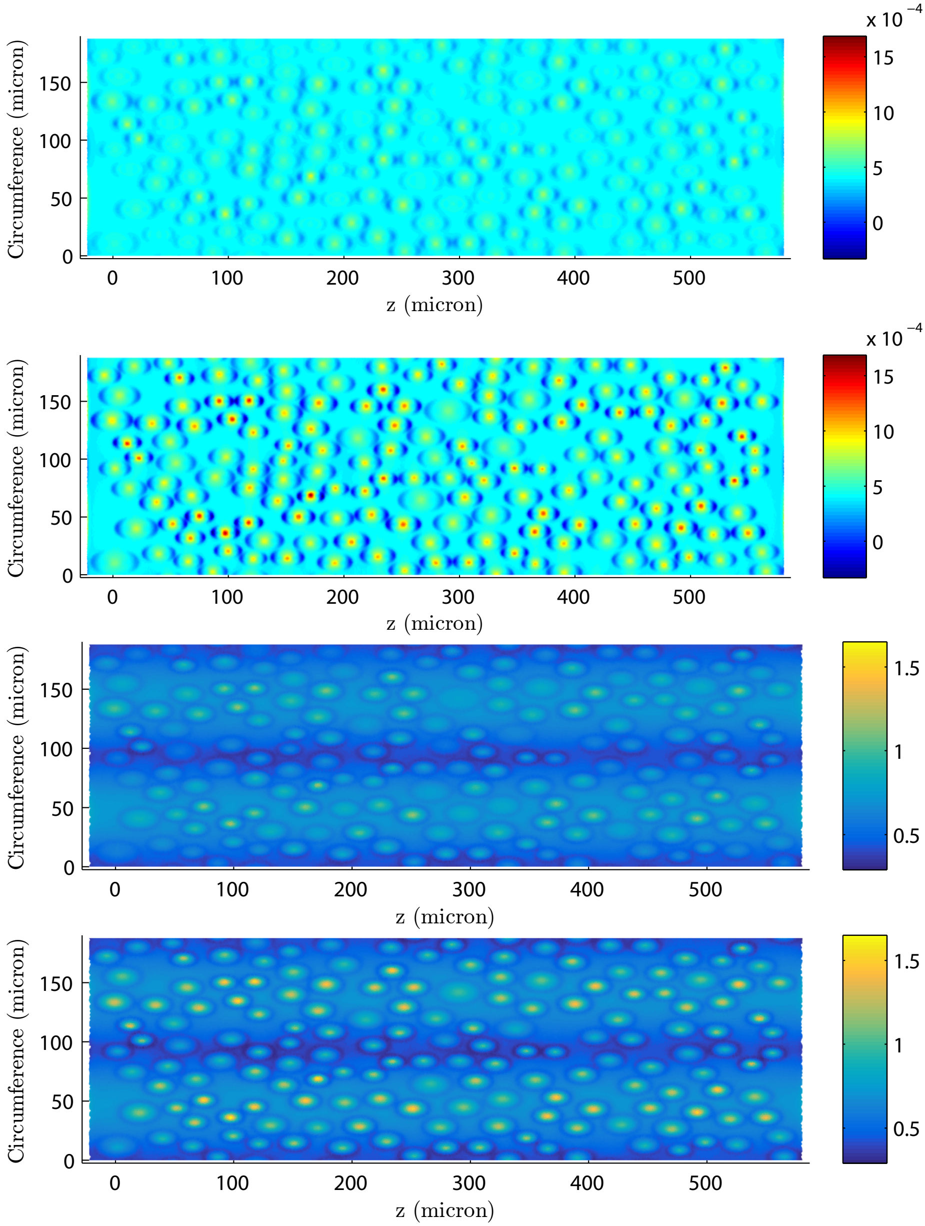

Figure 13: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

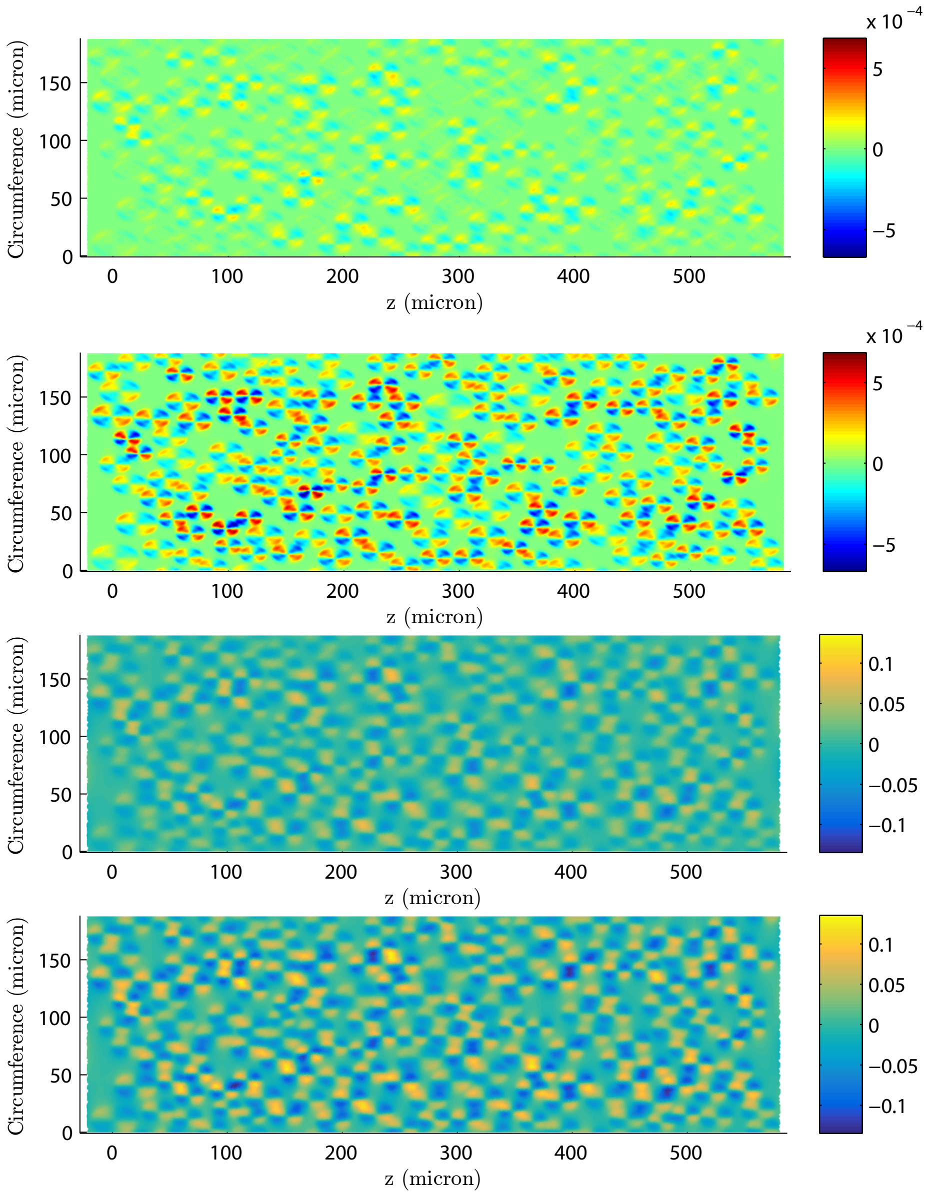

Figure 14: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

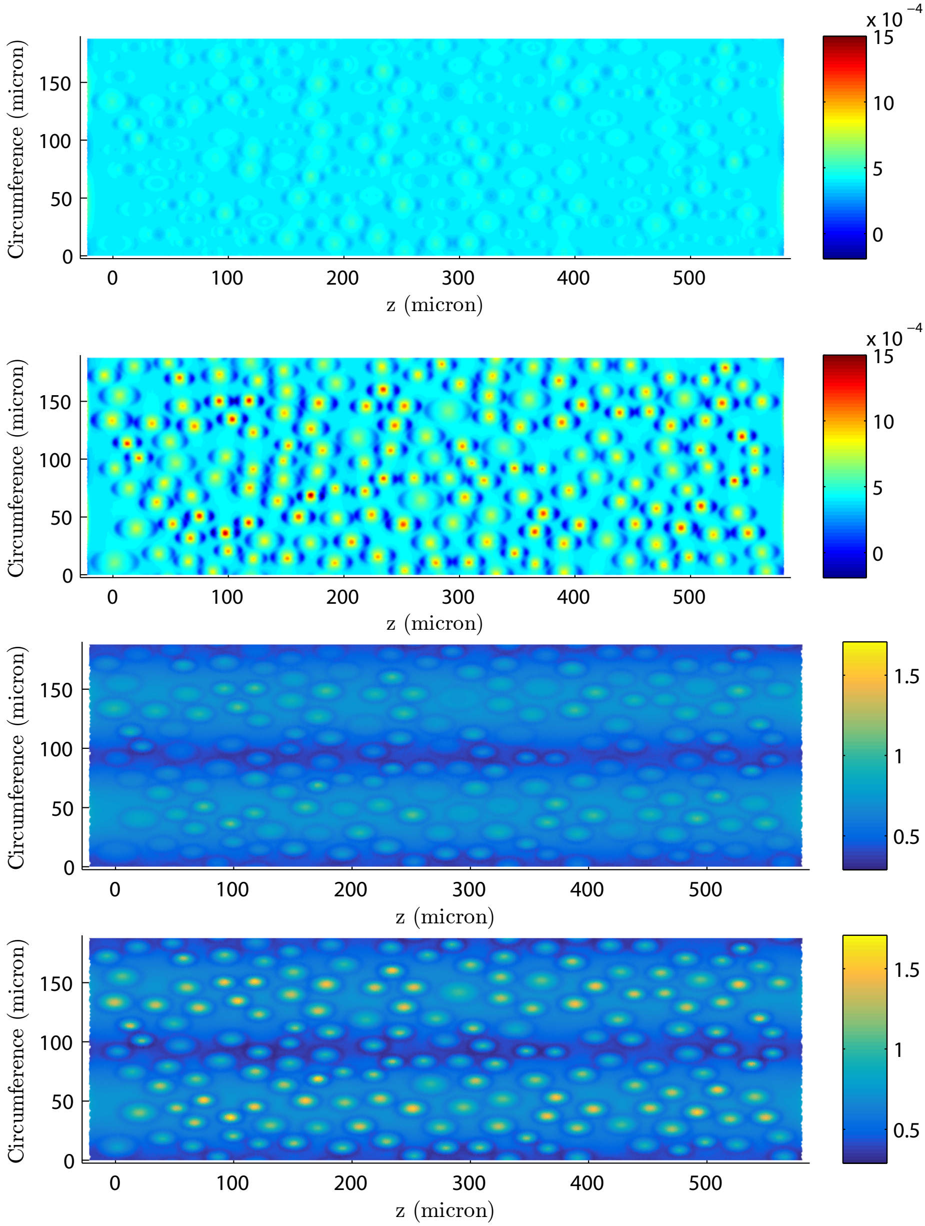

Figure 15: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\text{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1.5$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

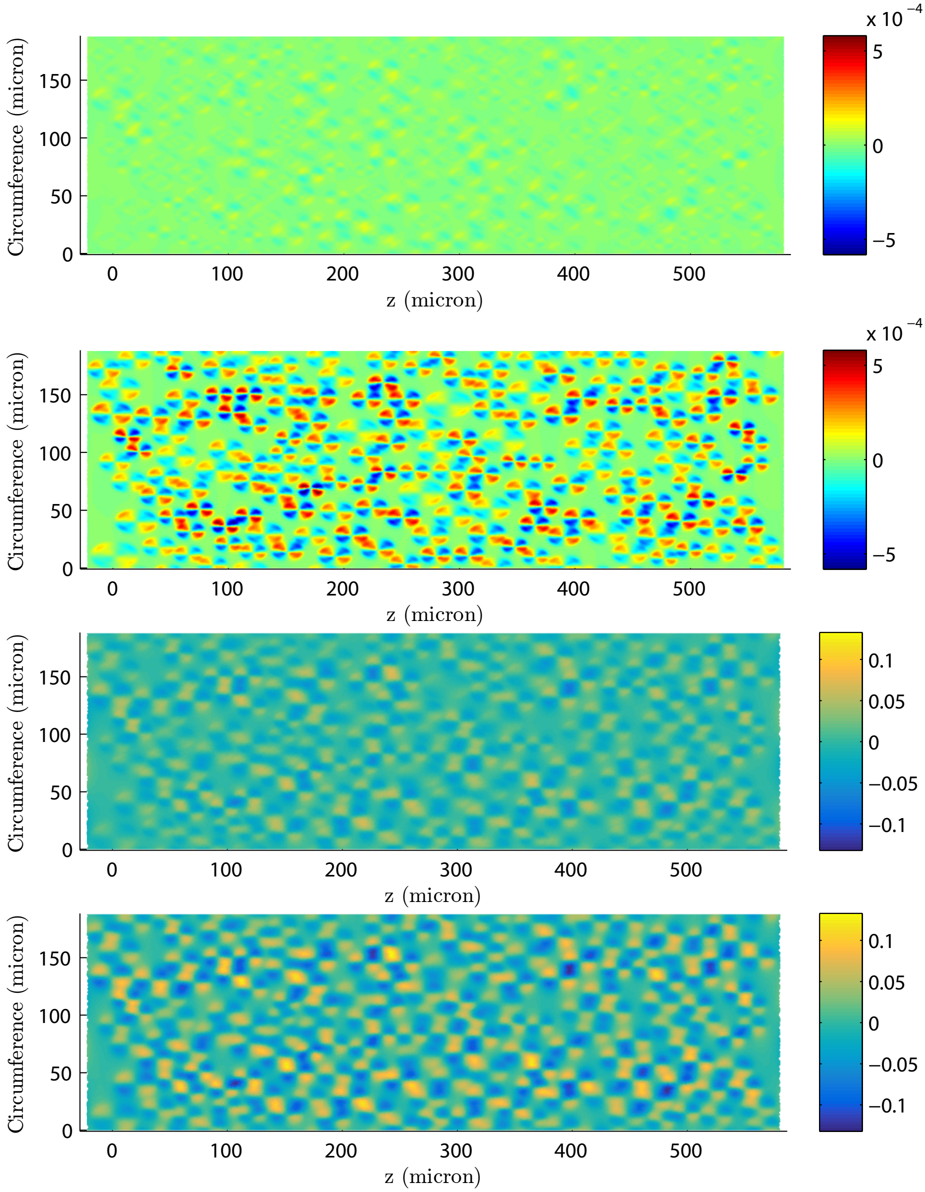

Figure 16: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\text{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\text{min}} = 1.5$, $\alpha_0 = 2.2$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

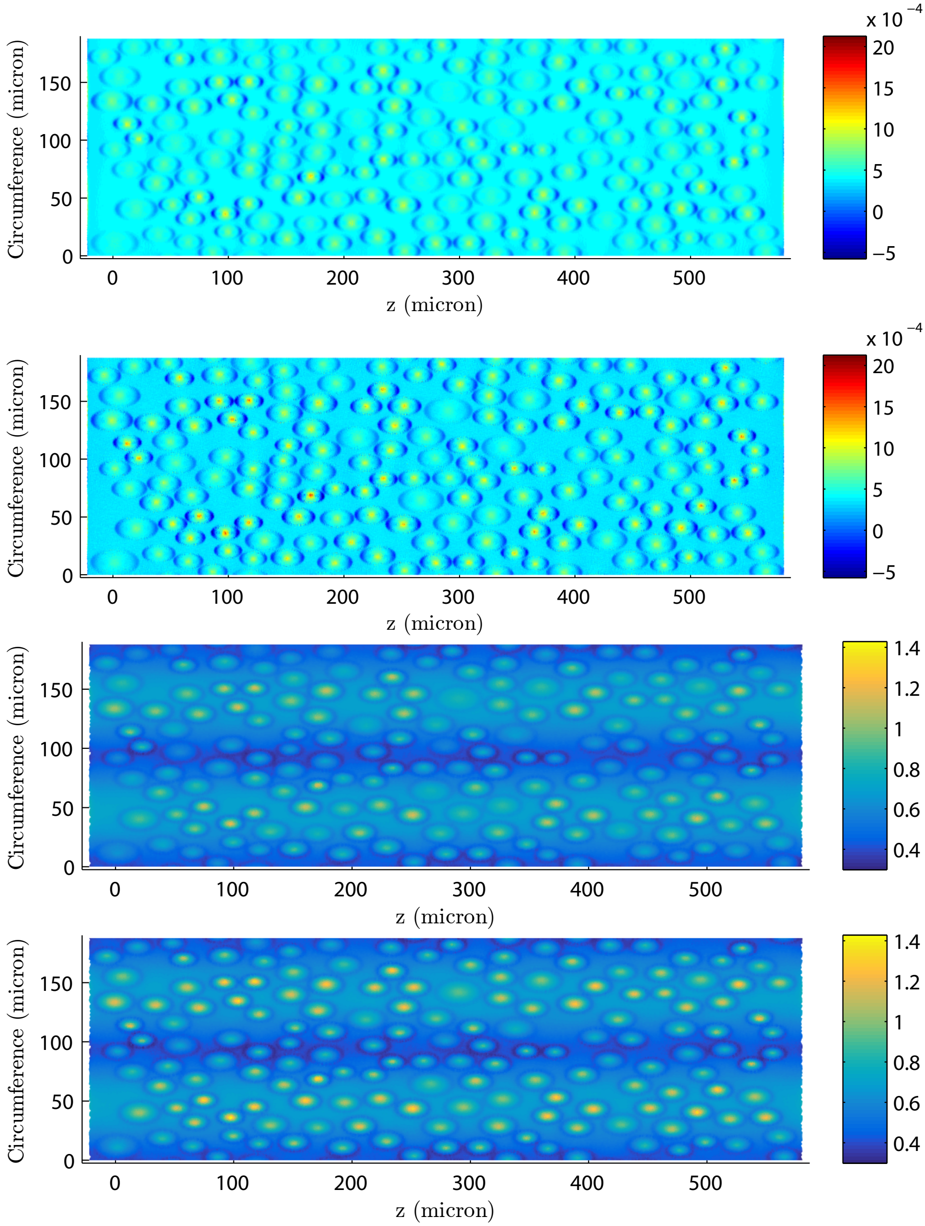

Figure 17: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

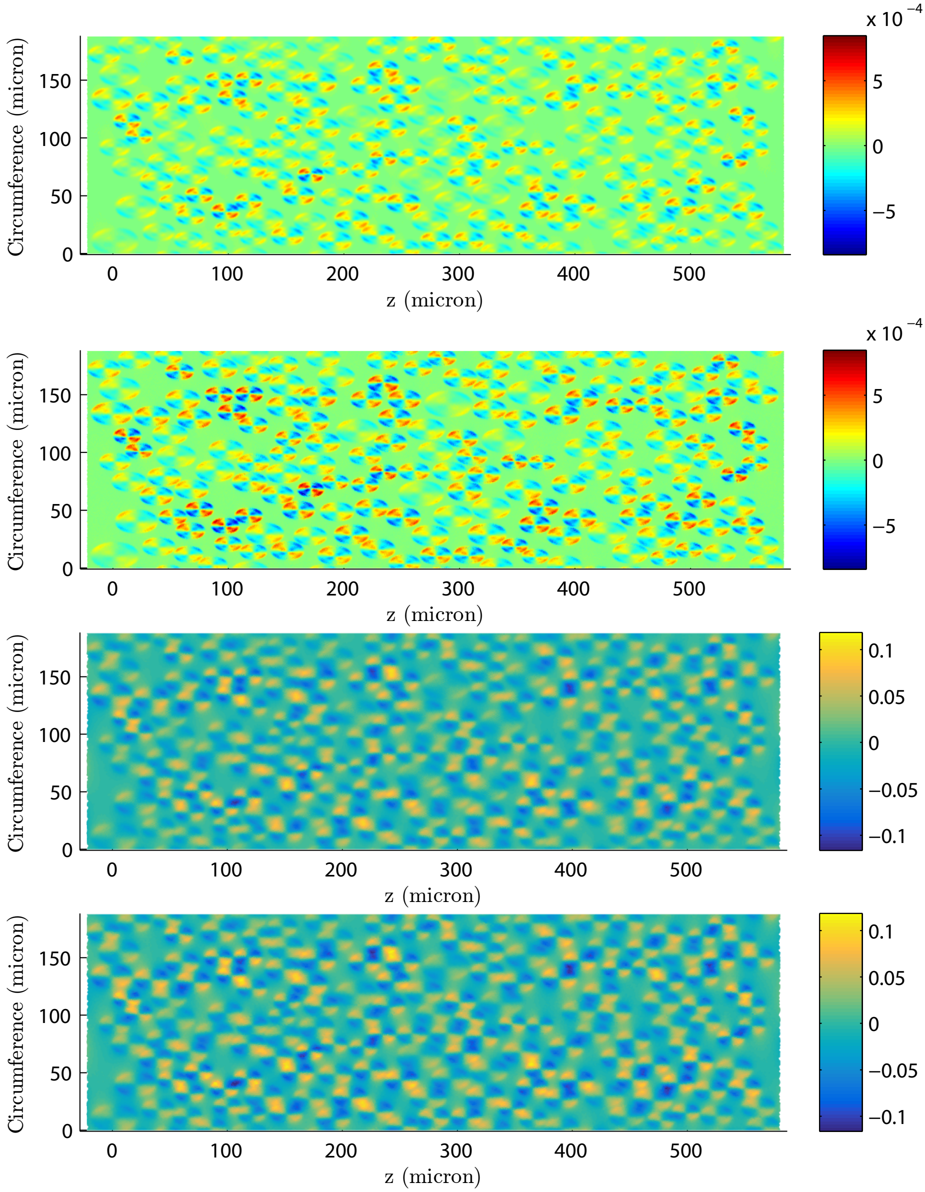

Figure 18: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.25$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

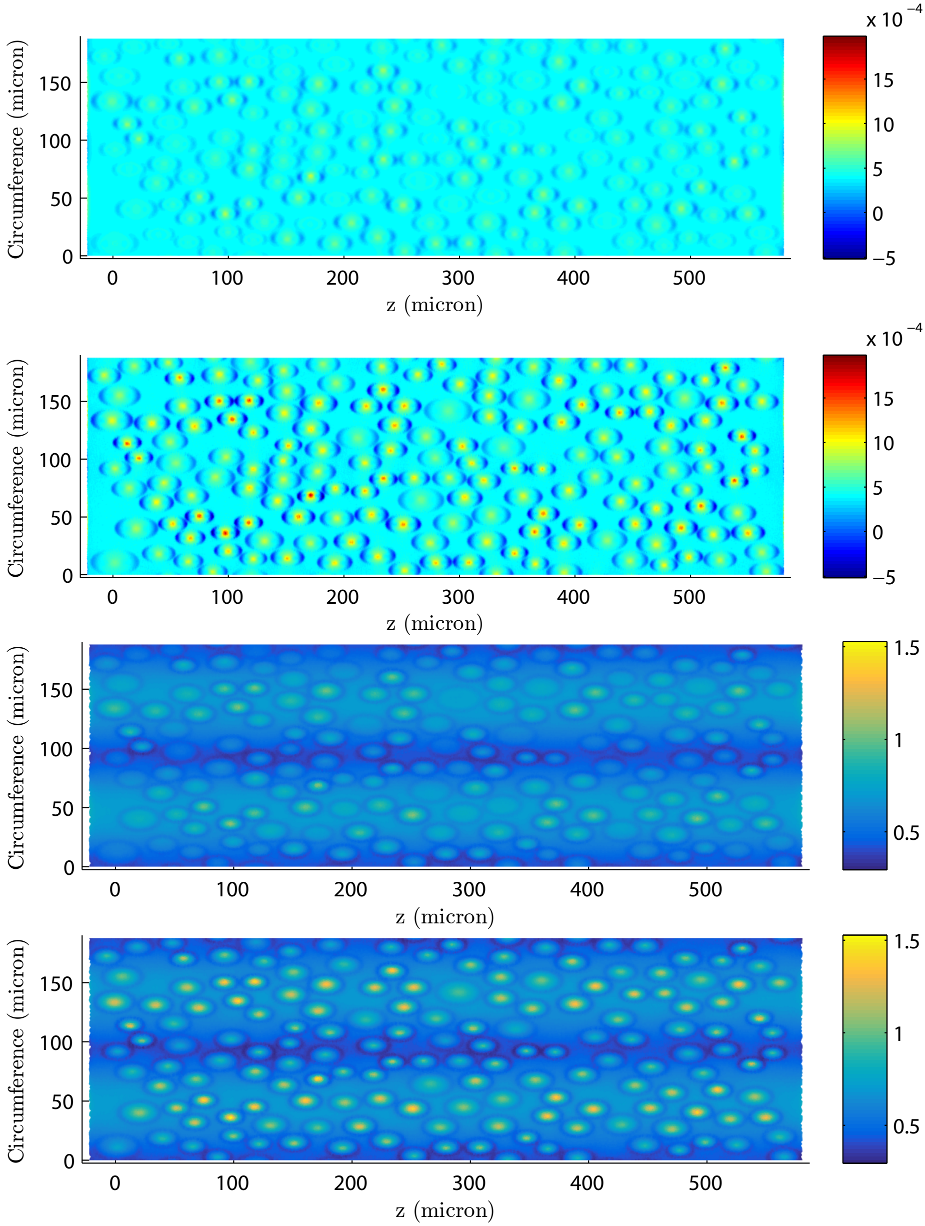

Figure 19: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

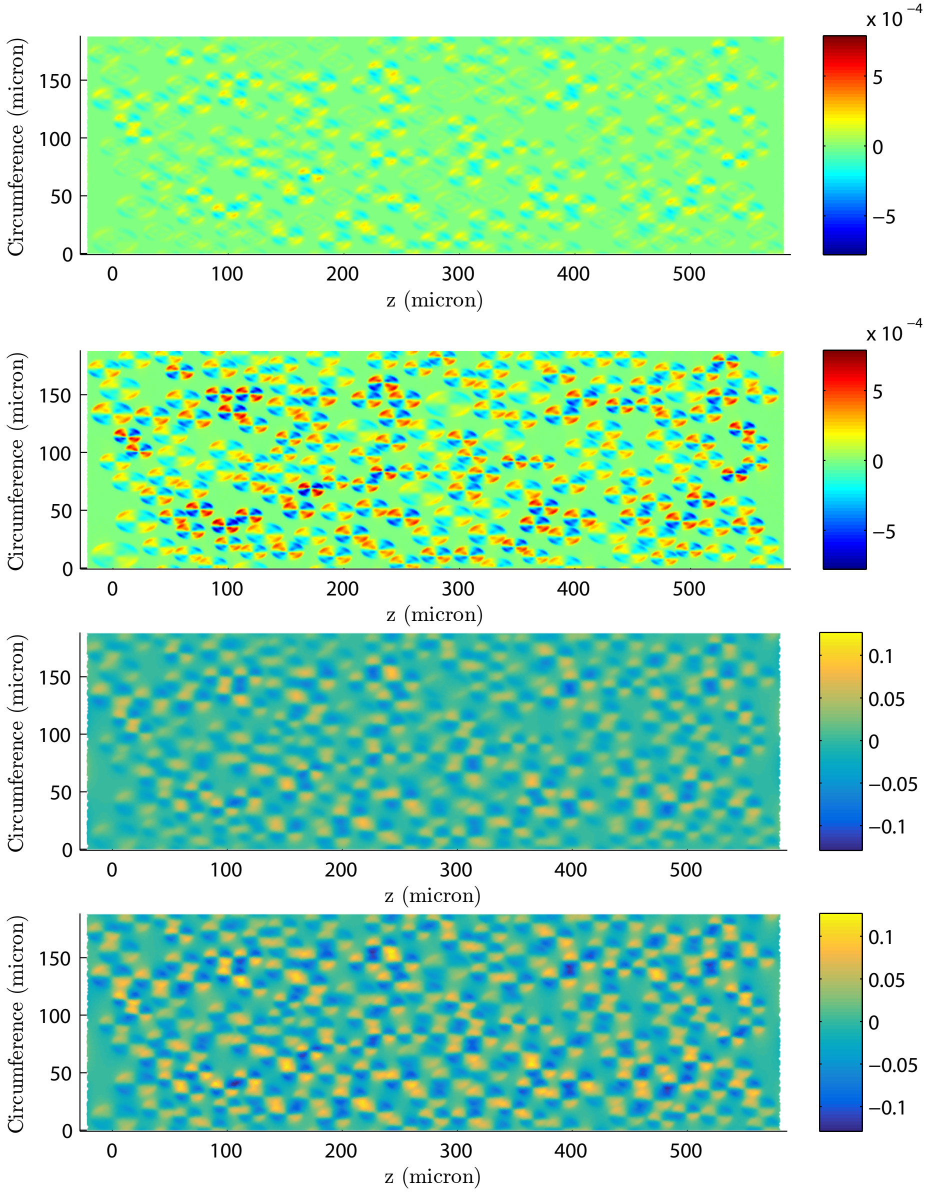

Figure 20: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 0.5$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

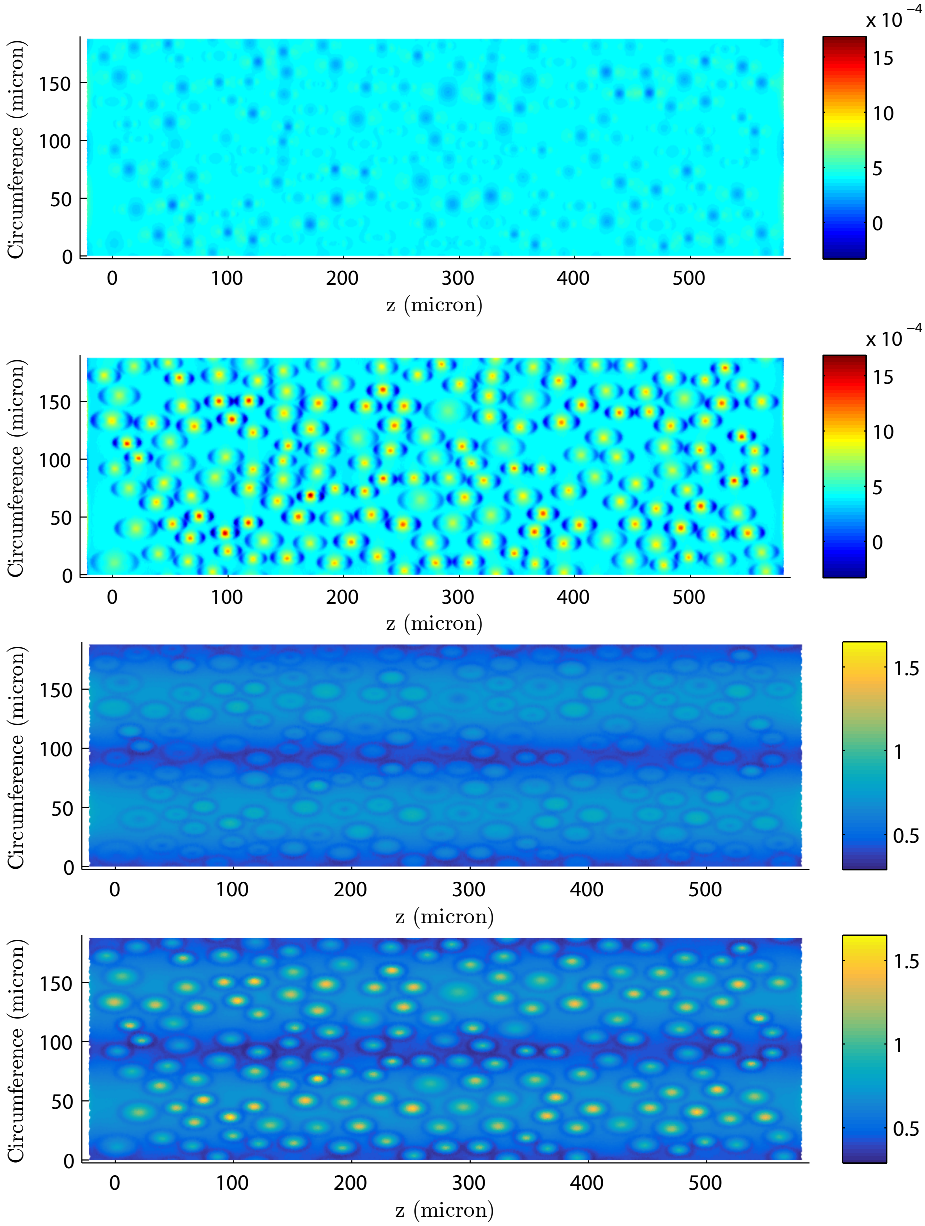

Figure 21: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

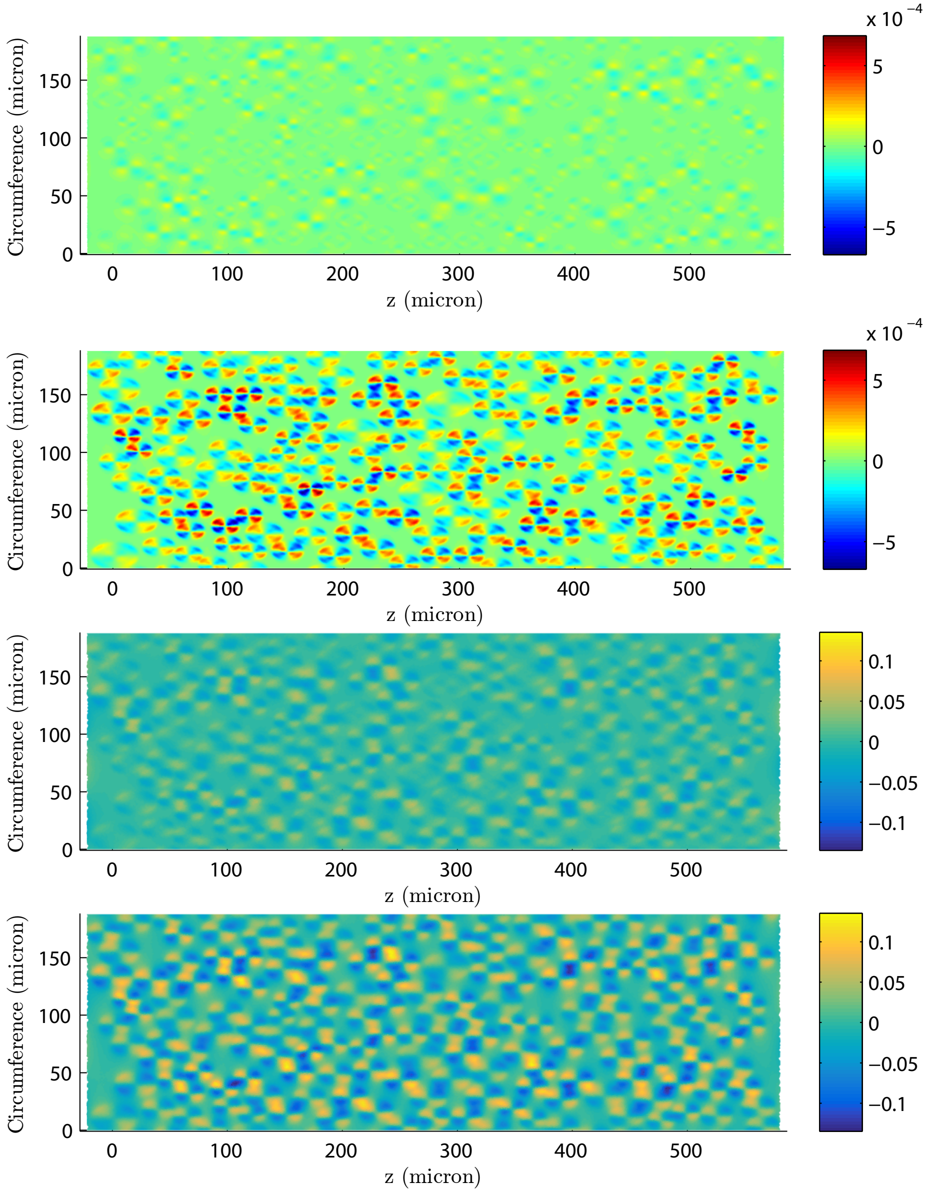

Figure 22: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

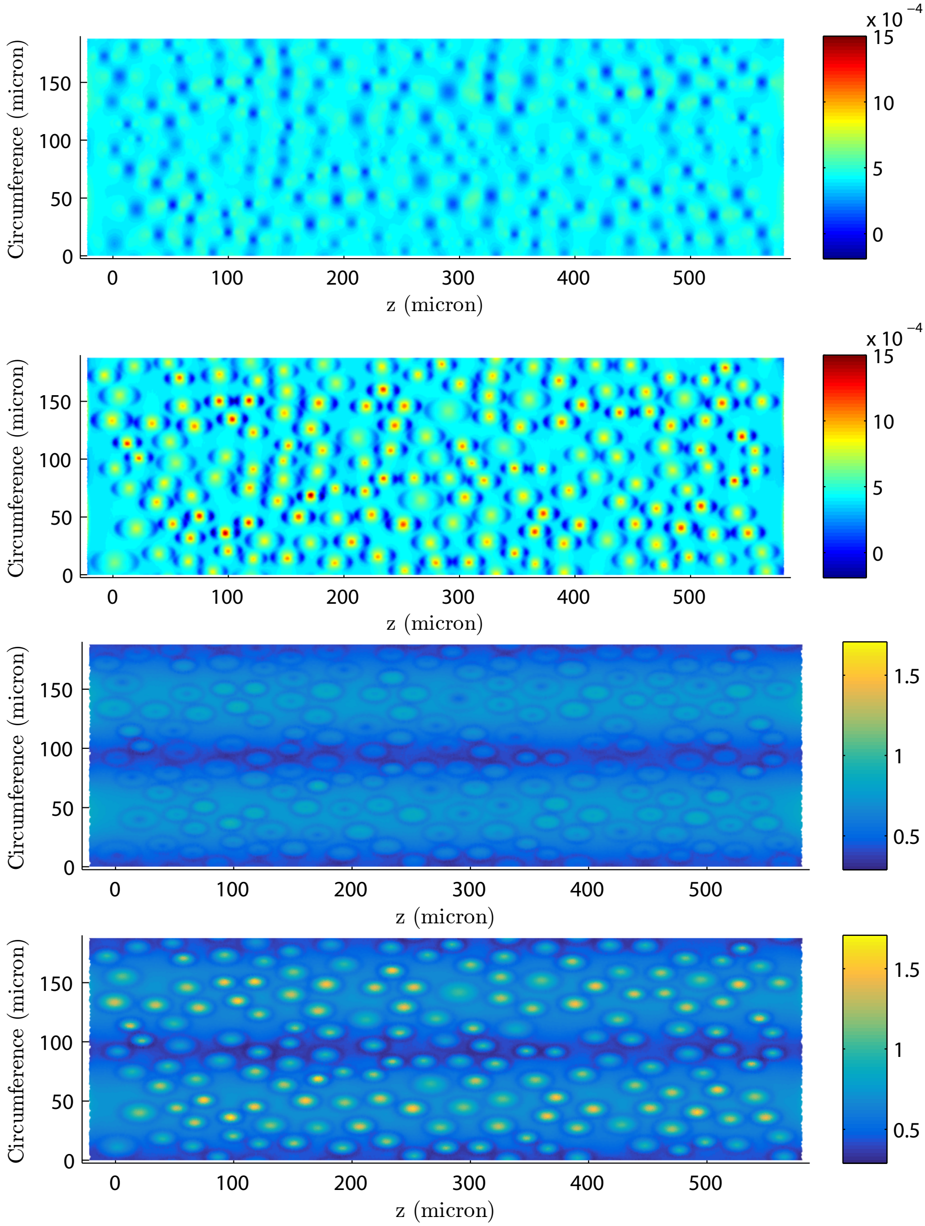

Figure 23: Longitudinal component of (a,b) fluid shear stress, g_z, and (c,d) elastic shear stress, h_z, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1.5$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)

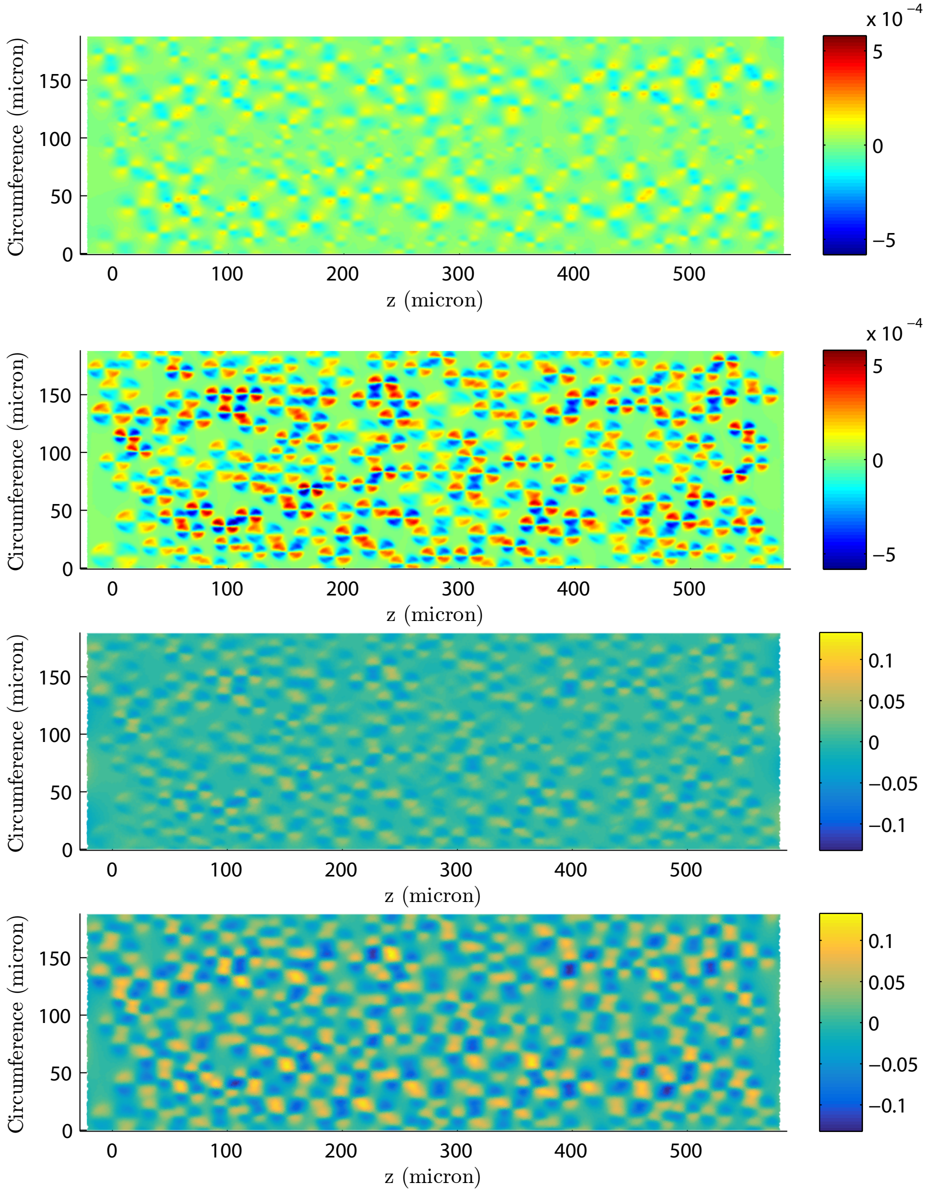

Figure 24: Azimuthal component of (a,b) fluid shear stress, g_θ, and (c,d) elastic shear stress, h_θ, exerted upon the endothelium in the low permeability limit ($K_P = 10^{-12}\,\mathrm{cm}^2$, $\lambda = 10^{3.5}$) when the minimum EGL thickness is $t_{\min} = 1.5$, $\alpha_0 = 3.4$. These stresses are computed using the asymptotic expression (3.10) and (3.27)-(3.29), respectively. We consider both a redistributed EGL of varying thickness (Model A, top image), and a non-redistributed EGL (Model B, bottom image)