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Supplementary Information for

Self-assembly of suspended collagen films and their viability as cell culture substrates

Megan J. Roberts,[a,b] Niharika Bhatt,[c] Chris M. Voge,[c] Eric R. Meshot,[a] Jan P. Stegemann[c] and A. John Hart* [a,b]

[a] *Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI 48109, USA.*
[b] *Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, 02139 USA. ajhart@mit.edu*
[c] *Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI 48109, USA.*

Address correspondence to: ajhart@mit.edu

Video S1: A video of the silicon pillars submerged in a collagen hydrogel, during evaporation under ambient conditions. As the water evaporates the meniscus recedes and leaves a suspended collagen network. The video has been sped up by 10x.

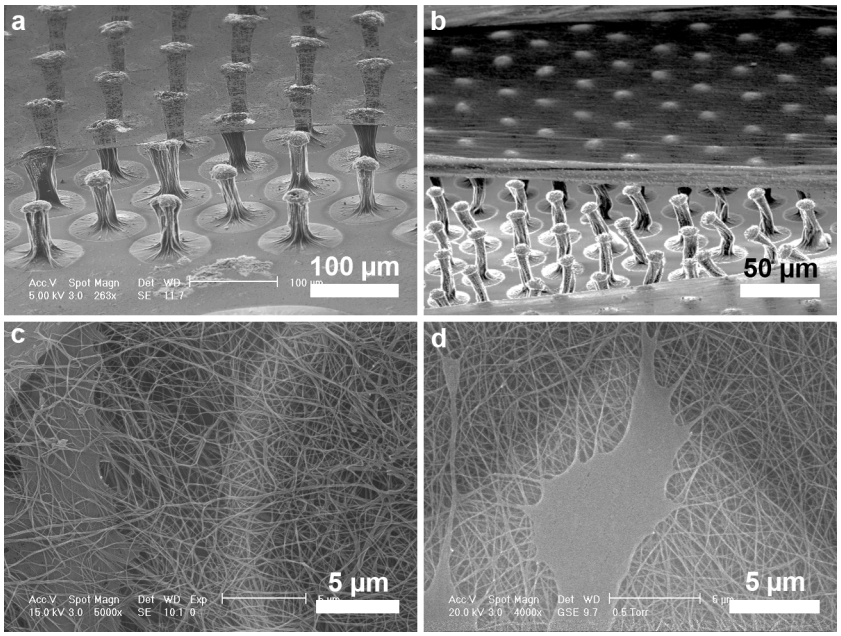
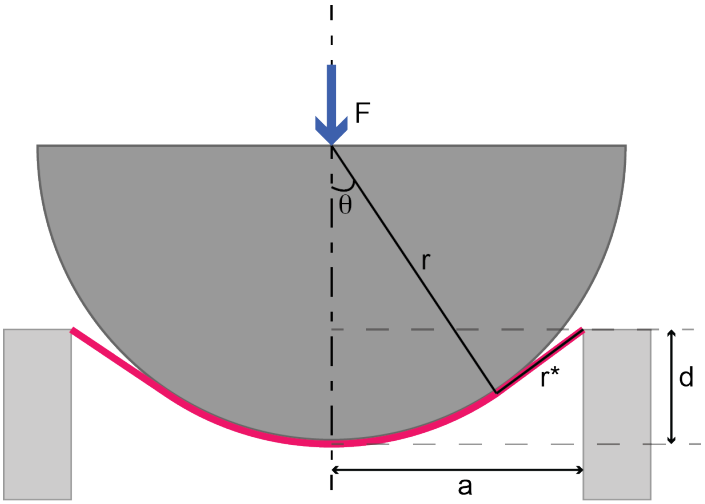


Figure S1: Collagen canopies formed on CNT microposts (5-100 µm diameter). (a) and (b) show that the canopies are suspended between pillars of aligned CNTs. (b) a round pillar is visible on the right side, and the suspended area is visible on the left side. We observed that the morphology of the canopy is the same for suspended and supported regions of the canopy. (d) A HDFb has attached to the canopy on top of a square pillar and is in physical contact with the collagen canopy.



$a = 50\ \mu m$
$r = 60\ \mu m$
F, d taken from experimental data

$$r^* = \sqrt{d^2 - 2rd + a^2}$$

$$\theta = \tan^{-1}\left(\frac{a}{r-d}\right) - \cos^{-1}\left(\frac{r}{\sqrt{(r-d)^2 + a^2}}\right)$$

$$\sigma_{max} = \frac{F}{2\pi t r \sin^2\theta}$$

$$\epsilon_{max} = \frac{(r^* - a - r\theta)}{a - r\theta}$$

Figure S2: Mechanical Model of Nanoindentation Test
The canopy (red) is assumed to be pinned by an annulus with radius a. The Nanoindenter (radius r) presses at the center of the annulus. We assumed no extension in the part of the collagen film in contact with the tip, and therefore that all of the tensile strain was in the free section (r*) of the film. Simple geometry was used to solve for the stress and strain in the free section of the membrane. The figure is meant merely as a cartoon and is not drawn to scale. In reality theta is approximately 0.1 radians.

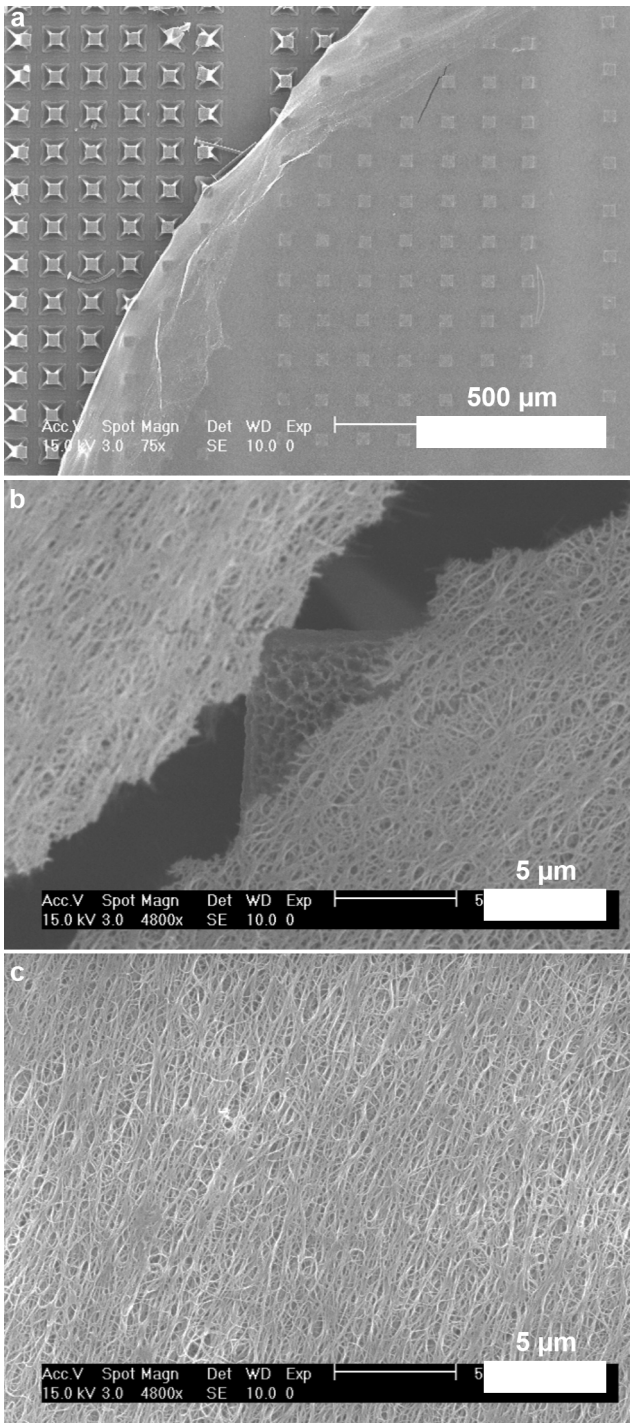


Figure S3: Fibrin canopies were formed on CNT posts. (a) The fibrin canopy covers a large area of the CNT post substrate. (b) The top of a CNT pillar is visible beneath the fibrin canopy through a tear, which formed while in SEM. (c) The fibrin canopy is a tangled network on the microscale.