

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: **Dynamic behavior of CESA3 in growing cotton fiber cells.** The mNeoGreen-tagged GhCESA3 foci are pseudocolored in green, and the microtubules are pseudocolored in magenta. Yellow circles indicate the motility of CESA3 foci.

File Name: Supplementary Movie 2

Description: **CSC distribution in growing cotton fiber cells at the elongation stage.**

File Name: Supplementary Movie 3

Description: **Microtubule organization in growing cotton fiber cells at the initiation stage.** The yellow arrow indicates MDZ in elongating fiber cells. And yellow asterisks indicate microtubules in the apex of fiber cells at the initiation stage.

File Name: Supplementary Movie 4

Description: **Microtubule organization in growing cotton fiber cells at the elongation stage.** The yellow arrows indicate microtubules at the apex region of cotton fiber cells. And the yellow brackets highlight the microtubule arrays in the shank region of cotton fiber cells.

File Name: Supplementary Movie 5

Description: **Computational simulation of cotton fiber elongation with different CMF deposition patterns.** Compared with uniformly deposited CMFs (top), a gradient of CMFs led to a gradually increasing strain at the apex (bottom). These descriptions are not included in the Article or Supplementary Information files.