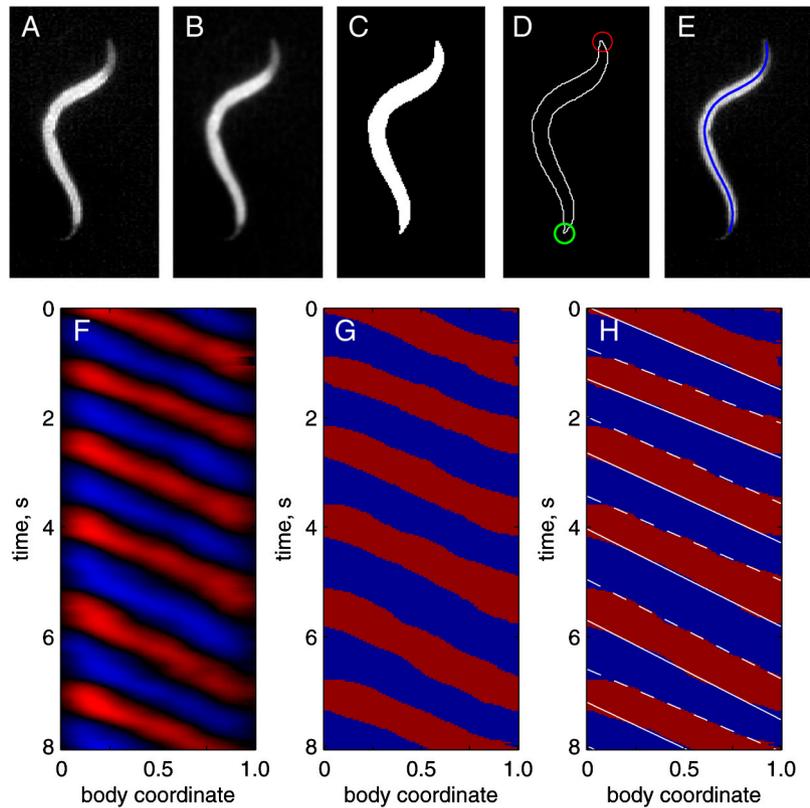# Supporting Information

Fig. S1. Quantitative analysis of worm locomotion. (*A*) Cropped dark field image of a worm in dextran solution. (*B*) Image after filtering. (*C*) Binary image after thresholding and region closure. (*D*) Worm boundary with head and tail determined by software. (*E*) Image with spline fit to centerline of worm body. (*F*) Time-dependent curvature as in Fig. 2*B*. (*G*) Regions of positive (red) and negative (blue) curvature. (*H*) Same as *G* with lines showing least-square linear fits to zero crossings of curvature. Solid lines represent fits to zero crossings with negative temporal derivative; dashed lines represent fits to zero crossings with positive temporal derivative.
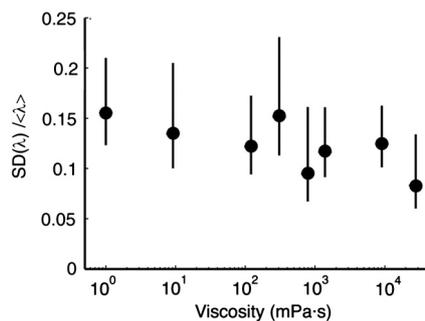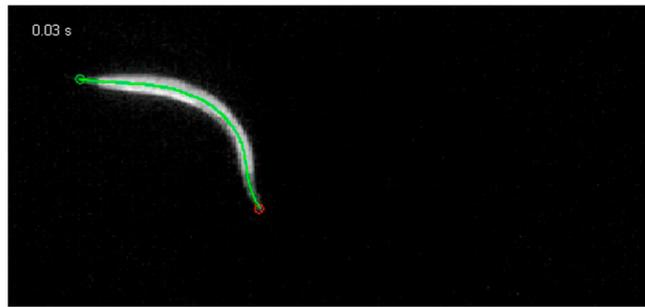

Fig. S2. Normalized standard deviation of wavelength as a function of viscosity. Error bars indicate 95% confidence interval of standard deviation. $N \geq 15$ worms for each viscosity.
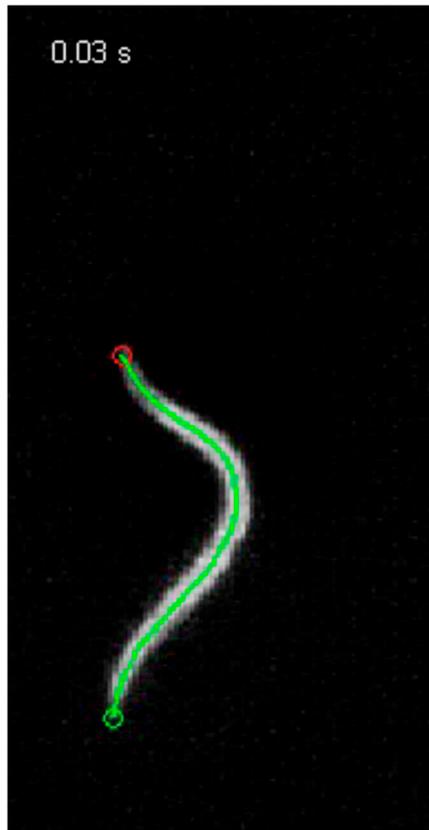
Movie S1. Adult *C. elegans* swimming in NGM buffer, viscosity 1 mPa·s. Circles indicate head and tail; green line indicates worm centerline as calculated by image analysis software.

Movie S1 (MOV)
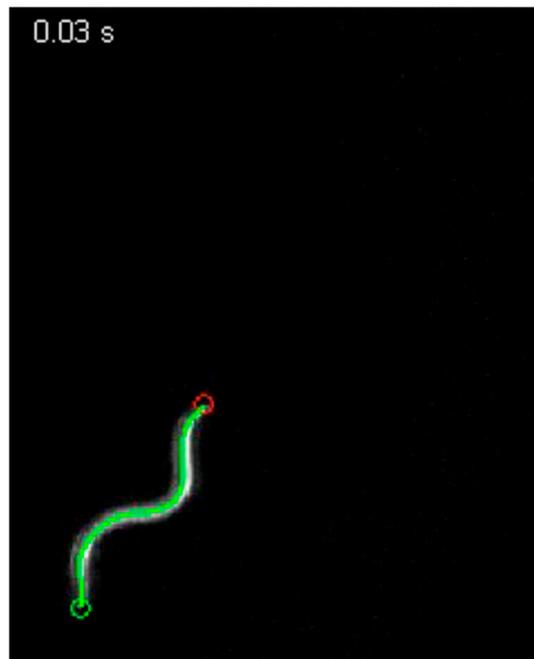
Movie S2. Adult worm crawling on 2% agarose surface.

Movie S2 (MOV)

Movie S3. Adult worm in dextran solution with viscosity 980 mPa·s.

Movie S3 (MOV)

Movie S4.   Adult worm in dextran solution with viscosity 28,000 mPa·s.

Movie S4 (MOV)

Movie S5.   Relaxation of adult worm from transient deformation by glass probe, in NGM solution with viscosity 1 mPa·s. (see Fig. 4*A*).

Movie S5 (MOV)