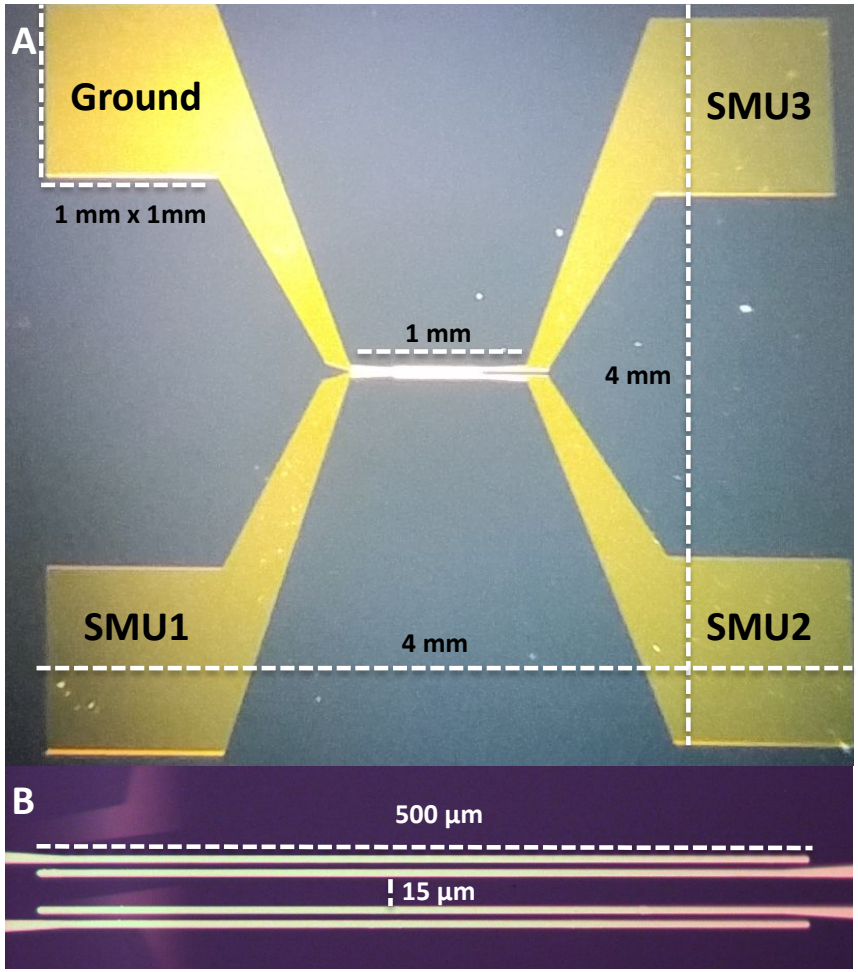
Supplementary Material

An *Escherichia coli* Chassis for Production of Electrically Conductive Protein Nanowires

Toshiyuki Ueki[1,2†], David J.F. Walker[1,2†], Trevor L. Woodard[1], Kelly P. Nevin[1], Stephen S. Nonnenmann[2,3], and Derek R. Lovley* [1,2]
[1]Department of Microbiology, University of Massachusetts-Amherst, Amherst, MA, USA
[2]Institute for Applied Life Sciences, University of Massachusetts-Amherst
[3]Department of Mechanical and Industrial Engineering, University of Massachusetts-Amherst
[†]Authors contributed equally
*Corresponding author
Email: dlovley@microbio.umass.edu

Table S1. Primers used in this study. Recognition sequences for restriction enzymes are underlined.

Name	Sequence	Enzyme
Ptac-F	TTCAGATCTGCAAATATTCTGAAATGAGC	BglII
Olac-R	TTCTCTAGAGGGGAATTGTTATCCGCTCAC	XbaI
hofB-F	TCTGAGCTCAGGAAGGAGCGGCAATGAATATTC	SacI
hofC-R	ATCTCTAGATTATCCCATCCCACTCATC	XbaI
hofM-F	ATCTCTAGAAGGCCGTCAGAGTGACGGGTGATAAG	XbaI
hofQ-R	TCTAAGCTTACTCACTGGAAACCAGTC	HindIII
ppdA-F	TCTAAGCTTAGGAGACTGCCGGCATGAAAACACAAC	HindIII
ppdC-R	GTCATTATTGTTGCTCCCTGCTACTGACGATTCGGACAATG	
gspO-F	CATTGTCCGAATCGTCAGTAGCAGGGAGCAACAATAATGAC	
gspO-R	TCTCTCGAGTTATCTGCAAGCACAGATCC	XhoI
ppdD-F	TCTCATATGGACAAGCAACGCGGTTTTAC	NdeI
ppdD-HA-R	TCTGAGCTCTTACGCGTAGTCCGGCACGTCGTACGGGTAGTTGGCGTCATCAAAGCGG	SacI
EPS-GspilA-F	TCTCATATGGACAAGCAACGCGGTTTCACCCTTATCGAGCTGC	NdeI
GspilA-R	TCTGAGCTCTTAACTTTCGGGCGGATAGG	SacI



Supplementary Figure S1. Diagram showing the architecture of the nanoelectrode devices used on the 4-probe measurements. The electrodes were made using photolithography with a custom mask. The wafer is composed of a 300 nm oxide layer on which 10 nm of tungsten then 40 nm of gold were placed on for the electrodes. The source voltage is applied at SMU1 and is removed at Ground. The voltage difference is measured between SMU2 and SMU3. A) The diameter of the device is 4 mm with each gold pad measuring 1 mm x 1mm. B) Close up detail of the interdigitated nanoelectrodes show the distance between SMU1 - SMU2 and SMU3 – Ground to be 3 µm, and the distance between SMU2 and SMU3 is 15 µm. The e-PNs when dropcast, bridge the gap between the interdigitated electrodes, allowing voltage sweeps to calculate the conductance values from the difference in current measured across the inner electrodes (Modified from reference 1).

References

1. Walker, D. J. F.; Adhikari, R. Y.; Holmes, D. E.; Ward, J. E.; Woodard, T. L.; Nevin, K. P.; Lovley, D. R., Electrically conductive pili from genes of phylogenetically diverse microorganisms. *ISME J.* **2018,** *12*, 48-58.