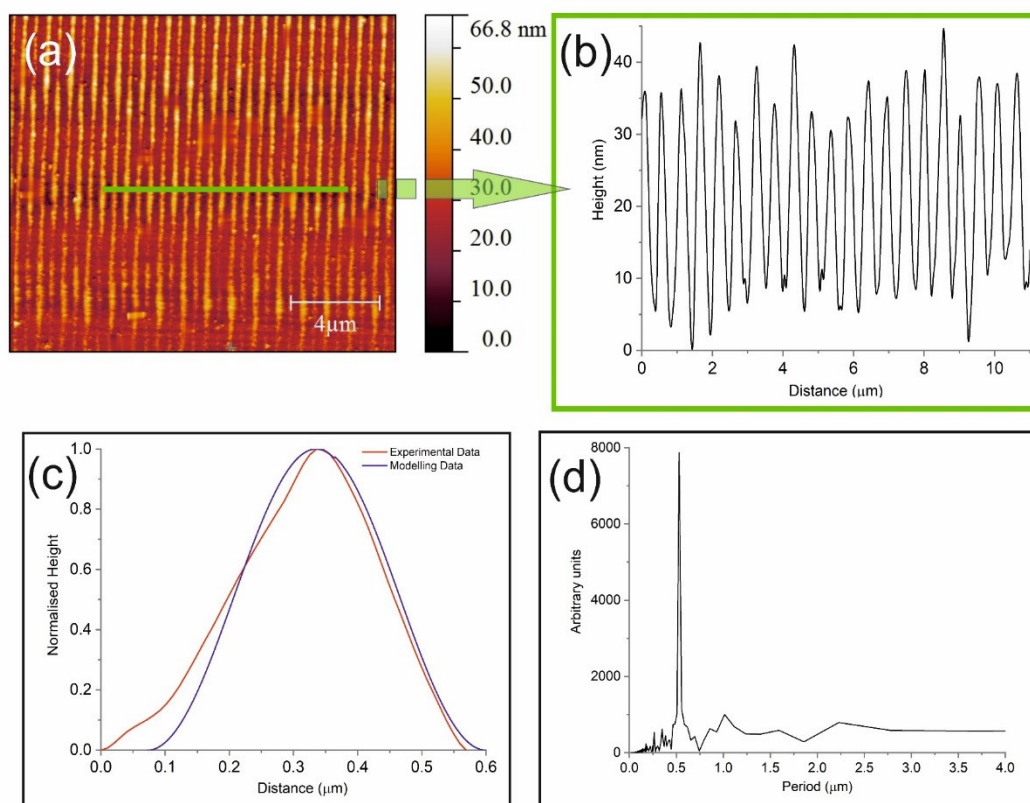


### Fabrication of the optical plasmonic sensing platform

The physical attributes of the surface topologies created from the UV processing were investigated by AFM showing the repeatability of the structures with typical surface corrugation depths of 60 to 100nm, a typical cross-section profile is shown in Figure s1a and s1b with an average modulation amplitude of ~40 nm and a normalised spatial variation shown in Figure s1c. Furthermore, Figure s1c also shows the predicted spatial irradiance pattern of a single fringe produced by the phase-mask used in the UV (244 nm) processing with a period 1.018  $\mu\text{m}$ . The predicted normalised spatial variation is calculated by a simple convolution of the irradiance spatial pattern of the phase mask and the spatial intensity distribution of the laser beam, assuming a simple multi-slit Fraunhofer diffraction along with the laser having a Gaussian beam with a beam spot size 0.3 mm and distance of 3  $\mu\text{m}$  from the phase mask to the sample. The two spatial distributions showed reasonable agreement with each other. Using the difference between both sets of data the root-mean-square (RMS) of the residuals yield a variation of 0.071, showing a strong similarity of strength of irradiance to geometric spatial change of the surface topology. Performing a Fast Fourier Transforms on the surfaces revealed a predominant period of the  $500 \pm 10$  nm with two minor periods of  $320 \pm 30$  nm and  $1040 \pm 30$  nm for the array, an example is shown in Figure s1d. Standard deviations of 16% from the average height and 12% from average width of the corrugations was found from the AFM data.



**Figure s1** Atomic force microscope image of a section of coated (coating Ge-SiO<sub>2</sub>-Pt) D-shaped fibre that has been UV processed. (a) An AFM topological map showing a typical surface of the material after UV exposure (germanium, silicon dioxide, platinum). (b) A typical cross-section profile of a UV processed coating (Ge-SiO<sub>2</sub>-Pt) from an AFM topological map. (c) A comparison between a typical single surface corrugation and the calculated spatial variation of UV irradiance produced phase mask with period of 1.018  $\mu\text{m}$  and the Argon ion laser (d) The FFT of a typical cross-section profile of a UV surface coating (Ge-SiO<sub>2</sub>-Pt).