Dip-Pen Nanolithography of Electrical Contacts to Single Graphene Flakes

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Supporting Information:

Figure S1. Optical images and the corresponding Raman spectra of a graphene flake before (a,b) and after (c,d) processing to isolate the monolayer region. The arrow in (a) indicates the monolayer region corresponding to the Raman spectrum in (b). The sharp, single 2D and G peaks are indicative of a single layer of graphene. The appearance of a strong D peak (~1350 cm⁻¹) after processing confirms the presence of defects as seen in the AFM images shown in Figure 6 of the paper.
Figure S2. AFM topography images of exfoliated graphene on SiO$_2$ before (left) and after (right) exposure to wet Au etchant. The graphene flake is above the dotted blue line; the SiO$_2$ substrate is below the dotted blue line.

Figure S3. AFM topography images of a graphene device exposed to additional Au etching for 8 min. (top) and 13 min. (bottom). The graphene flake is within the dotted blue lines.

Figure S4. Optical images of Au film on SiO$_2$ (a) before (pink) and (b) after (dark blue) O$_2$ plasma treatment. AFM images of SiO$_2$ after etching of Au film (c) without and (d) with O$_2$ plasma treatment.
Figure S5. AFM image of SiO$_2$ substrate after removal of sacrificial PMMA layer. NP residue remains on the substrate.