**Rebuttal Comments for JoVE51722\_R2**

We thank the Reviewers for their kind and constructive comments on this manuscript, and our corrections and responses are detailed below (lines numbers match main document with track changes on):

Reviewer #1

The word ‘layers’ has been removed from the title of the document (line 1) and the term ‘nanoscale imaging’ has been added to the keywords (line 32).

Details of the ion bombardment have been added (lines 330, 378 and 424) and the appropriate symbols added to the labels of the spectra in Figure 3c to aid the reader. The scale bar in Figure 2c is described in the associated caption.

Reviewer #2

In this body of work we only investigate graphene using an AFM contact-mode TERS system using a silver-coated probe specifically, rather than covering all the types of AFM modes and probes, this has been noted in line 112. Kharintsev et al, (2007) and Roy et al. (2010) have been added to line 108 describing the use of etched gold tips for TERS. The ‘enhancement’ factor of TERS tips has been purposefully avoided in this paper due to the difficulty in measuring this factor, instead focussing on the use of the term ‘contrast’. It is acknowledged that the example of TERS contrast in Figure 2 is purposefully lower than typically reported in literature to provide the reader with an example of the minimum contrast required for reliable TERS imaging, as expanded upon in line 259, 329 and 378. ‘adhesive tape’ has been added to lines 197-206.

Reviewer #3

Although it is not possible to add more details on the power of TERS for imaging graphene in the abstract, as described by the reviewer, due to the word limit, this has been expanded upon in the introduction for lines 90-92, and include the two examples given.

To aid in the understanding of the AIST-NT instrument, the protocol has been enhanced at lines 223-226, 236-240, 251-252, 257-262 and 280-282. Figure 1 has also been modified to include the X-, Y- and Z-axis in Figure 1a, and label where the positioning motors or scanners are in Figure 1b. The table of materials now includes a link to the AIST-NT Combiscope 1000 instrument, in case any readers wish for further information on this model.

The very relevant comment on the superposition of the TERS signal and conventional Raman spectroscopy signal has been included in lines 317-322, along with the relation to the calculation of contrast and the formula. Further changes are made in lines 267, 327 and 422-426 to accommodate this for the example in Figure 2d, whilst the comment on the higher contrast possible has already been addressed with Reviewer #2. A comment on the z-scale representing peak area is included in line 374.

The fact that it is possible to do TERS without a radial polarizer is included in lines 141-144, and the fact that oxidising the commercial cantilevers provides an improvement of the TERS probes, rather than it being a requirement, is included in lines 113-117, and contains the cited reference.

The minor comments by Reviewer #3 have also been addressed throughout the document.