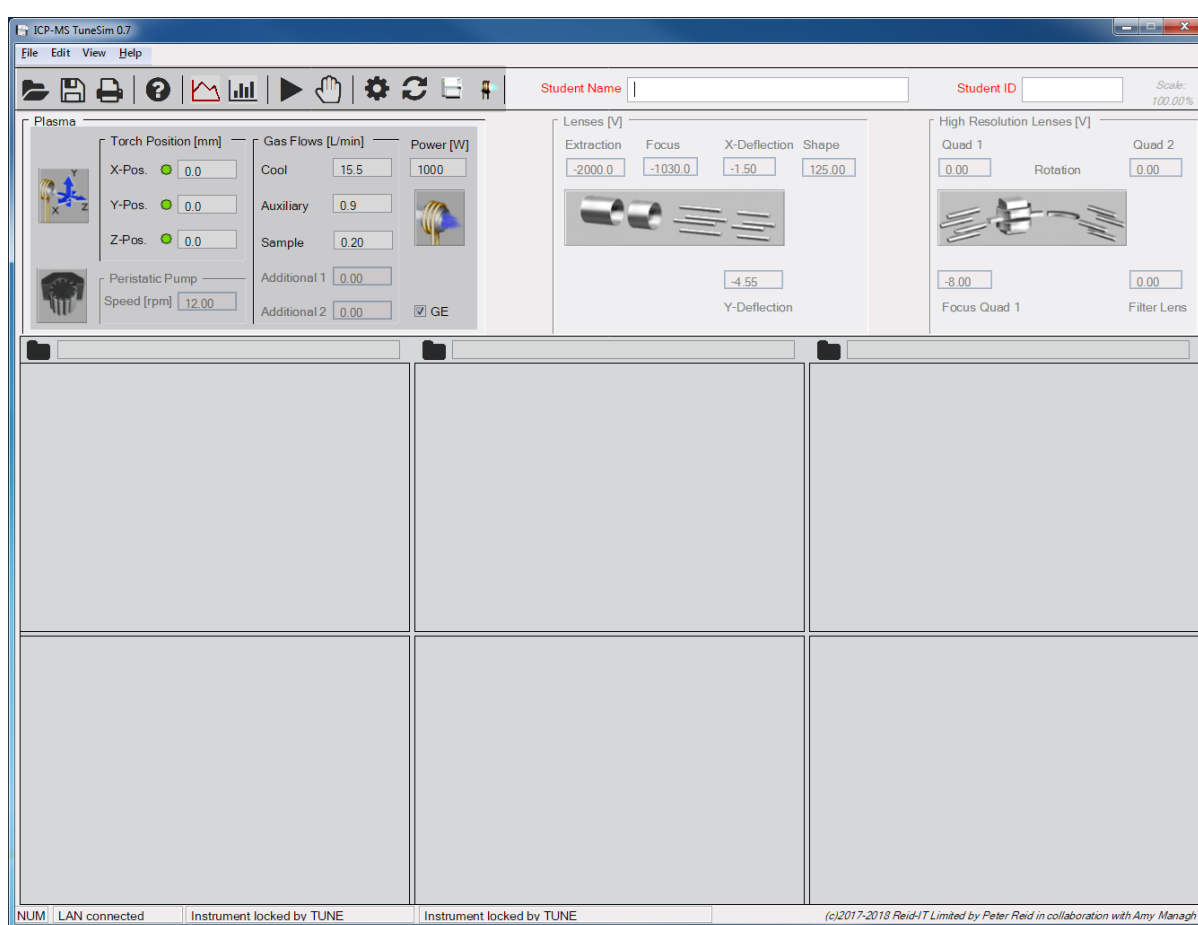


# ICP-MS Tuning Simulator

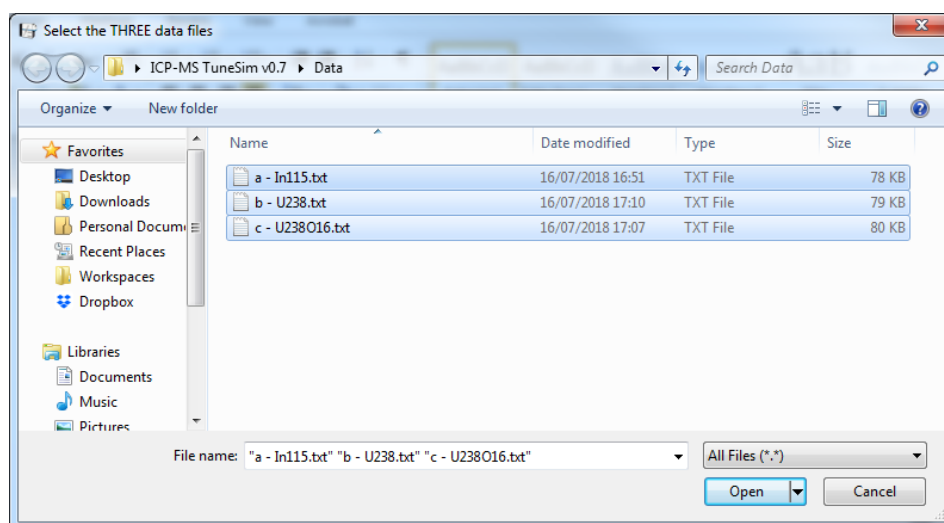
This app doesn't require any special installer or uninstaller if you decide to remove it. Simply unzip the archive you've downloaded and place the "**ICP-MS TuneSim**" folder on the Desktop. The app uses associated text and PDF files, such as "ICP-MS TuneSim.ini" to control the facilities and behaviour of the app. These files must remain in the folder alongside the app itself (\*.exe or \*.app).

1. Open the file ICP-MS TuneSim.exe. The program will initially appear as shown below:



The program functions will remain locked until a name and student number are inserted into the boxes located at the top right of the screen. Note, after entry these details are locked into the app and cannot subsequently be altered. Student numbers should follow the Loughborough University convention i.e. a letter followed by 6 numerical digits. This numbering convention can be altered to accommodate other institutions, upon request. Non-academic users can use the student number A123456 to access the app.

2. Load data by navigating to the open file icon at the top left of the screen.

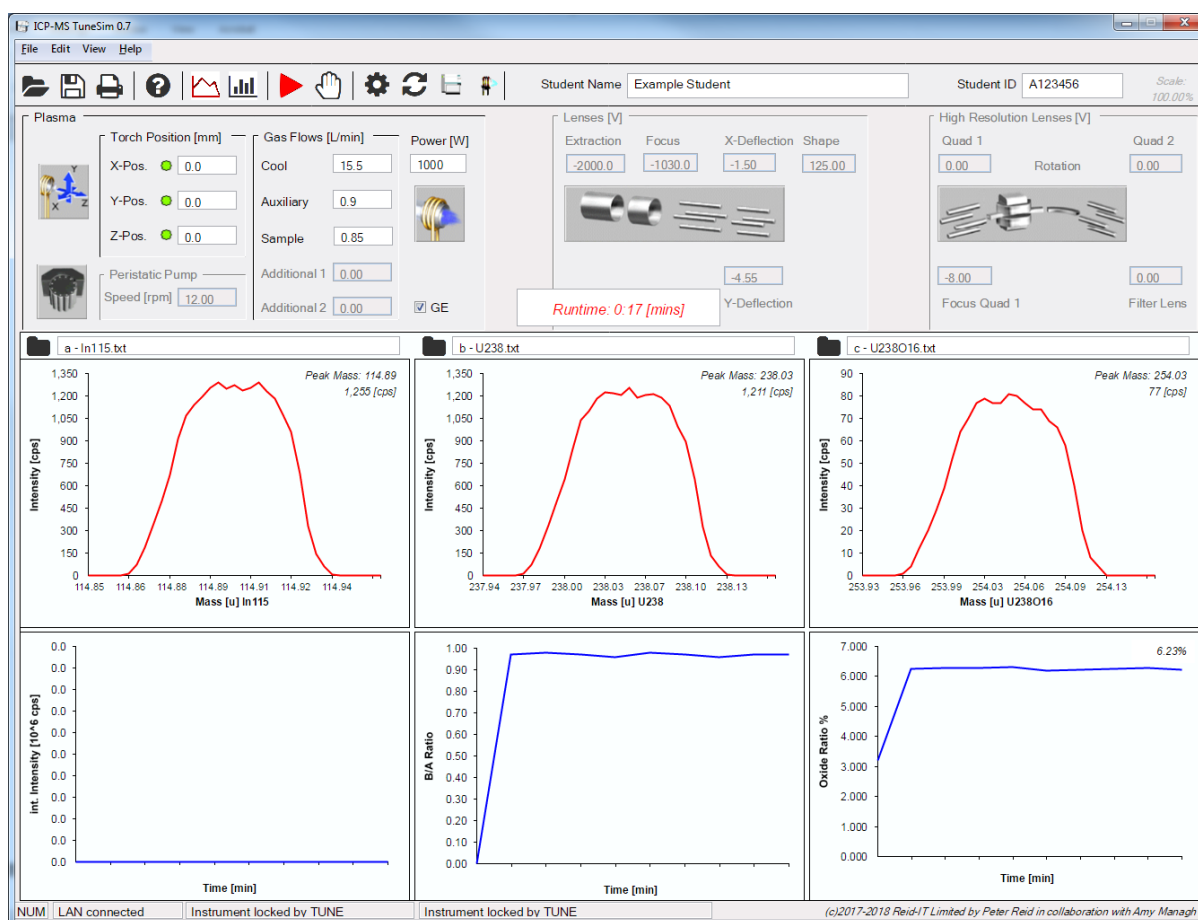


Select the three data files provided and click Open. Do not rename these files.

3. To begin the simulation, press the start button.



The initial view will appear, as shown below:



The loaded files contain data for the analysis of a solution containing 1ppb of In and U, sprayed into the ICP-MS using a concentric nebuliser and a cyclonic spray chamber.

The top panels show the measured signal for the three analytes selected in real time:

- Top left:  $^{115}\text{In}$  signal – to assess sensitivity
- Top middle:  $^{238}\text{U}$  signal – a marker for mass balance
- Top right:  $^{238}\text{U}^{16}\text{O}$  – to indicate possible polyatomic interferences

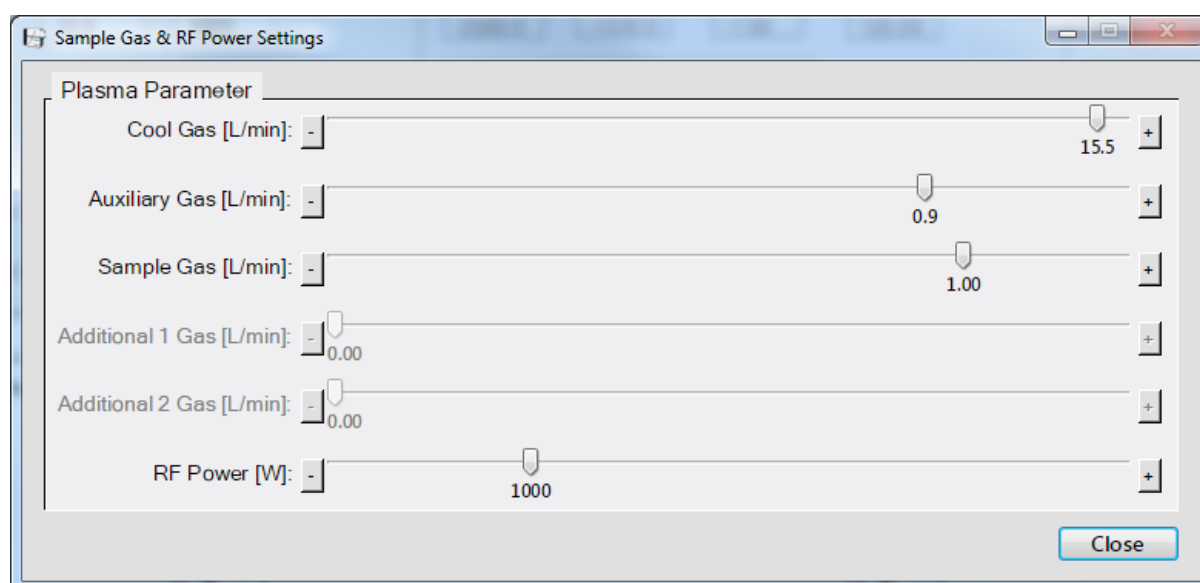
The lower panels show the trend in the integrated peak areas for the analytes over the tuning session:

- Lower left: the trend in signal from  $^{115}\text{In}$ .
- Lower middle: the ratio between  $^{238}\text{U}^{238}$  and  $^{115}\text{In}$
- Lower right: the oxide ratio ( $\text{UO}/\text{U} \times 100$ )

4. To adjust the tune settings, click the torch position and plasma logos.



This will open a pop-up with slider controls, as shown below.



The aim is to achieve the highest possible In signal, whilst maintaining a low oxide ratio. As a guide, the instrument has a factory specification of 1 million counts per second (cps) per ppb of indium, but in practice much higher signals than this can be achieved. The desired oxide ratio will depend on the application being performed, but should usually be below 5%. In this simulation the Cool and Auxiliary gas and the lenses have been set for you and **should not be adjusted**. However, the torch positions, sample gas and RF power will require tuning. It is advisable to begin by first turning up the sample gas to around 0.7 - 1.0 L/min.

5. Help is available by clicking on the question mark icon.



6. Once tuning is finished, click on stop.



7. The results can either be saved to a pdf or printed.



Note that the save and print functions are not available whilst the simulation is still running.

8. Once finished, close the program by navigating to File and then Quit.