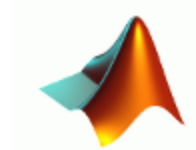
Digital Grain Size

Version 2, Jan 2011

Quick start guide for MATLAB



Grain Size from Digital Images of Sediment

Computer code

Rubin, D.M., 2004, A simple autocorrelation algorithm for determining grain size from digital images of sediment: Journal of Sedimentary Research, v. 74, p. 160-165. (454 K PDF)
Example of basic code for obtaining grain size using calibrated spatial autocorrelation.

Buscombe, D., Rubin, D.M., and Warrick, J.A., 2010, A universal approximation of grain size from images of noncohesive sediment: Journal of Geophysical Research, v.115, F02015, doi:10.1029/2009JF001477. (840 K PDF)
Grain-size toolbox created by Dan Buscombe
Download "DGS_toolbox_sep2010.zip", 74 K zip file and 266 K uncompressed set of files/folders

Warrick, J.A., Rubin, D.M., Ruggiero, P., Harney, J., Draut, A.E., and Buscombe, D., 2009, Cobble cam: grain-size measurements of sand to boulder from digital photographs and autocorrelation analyses: Earth Surface Processes and Landforms 34, 1811-1821, doi:10.1002/esp.1877. (834 K PDF)
Code for grain size of sand, gravel, and cobbles
The following files can be used to conduct 'Cobble Cam' grain size analyses on digital photographs as described in Warrick et al. (2009). Please see the read_me.rtf file for more information.
Download the whole folder as a .zip: warrick_cobblecam.zip; or as individual files listed below:

- read_me.rtf
- EyeballS_FINAL.m
- AutoCorrS_Vert.m
- ypix_JAW.txt
- JAW_calibdata_150.txt
- PlotGen_AC_Call.m
- crop_jpg2tif.m
- measure_mm2pix.m

Step 1:
go to
http://walrus.wr.usgs.gov/seds/grainsize/code.html
and download the DGS toolbox

Grain Size from Digital Images of Sediment

Grain Size from Digital

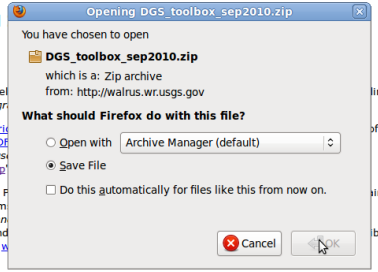
Computer code

Rubin, D.M., 2004, A simple autocorrel ...liment: Journal of Sedimentary Research, v. 74, p. 160-165. (454 K PDF)
Example of basic code for obtaining gr

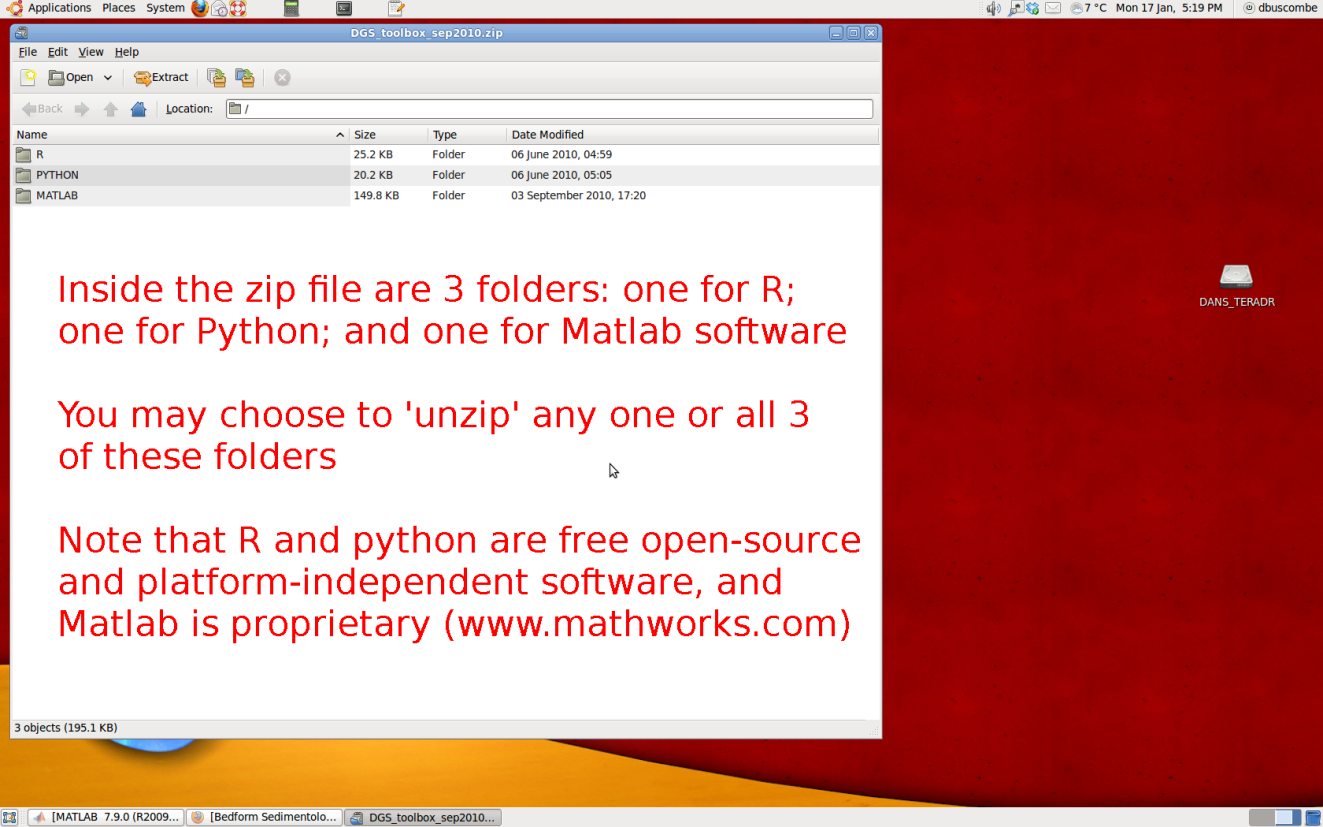
Buscombe, D., Rubin, D.M., and Warri ...f noncohesive sediment: Journal of Geophysical Research, v.115, F02015,
doi:10.1029/2009JF001477. (840 K PDF
Grain-size toolbox created by Dan Bus
Download "DGS_toolbox_sep2010.zip"

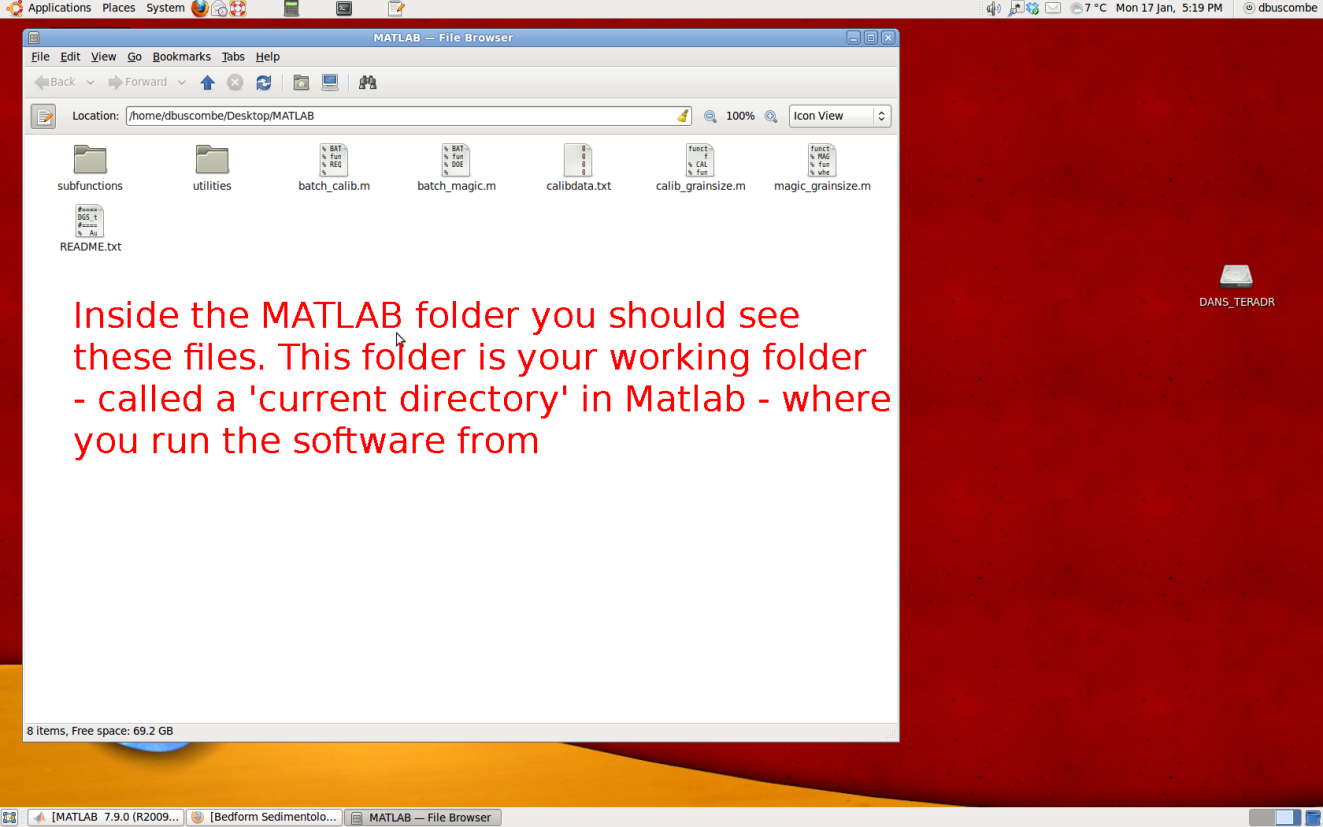
Warrick, J.A., Rubin, D.M., Ruggiero, F ...in-size measurements of sand to boulder from digital photographs and autocorrelation analyses:
Earth Surface Processes and Landform
Code for grain size of sand, gravel, an
The following files can be used to cond ...bed in Warrick et al. (2009). Please see the read_me.rtf file for more information.
Download the whole folder as a .zip: w

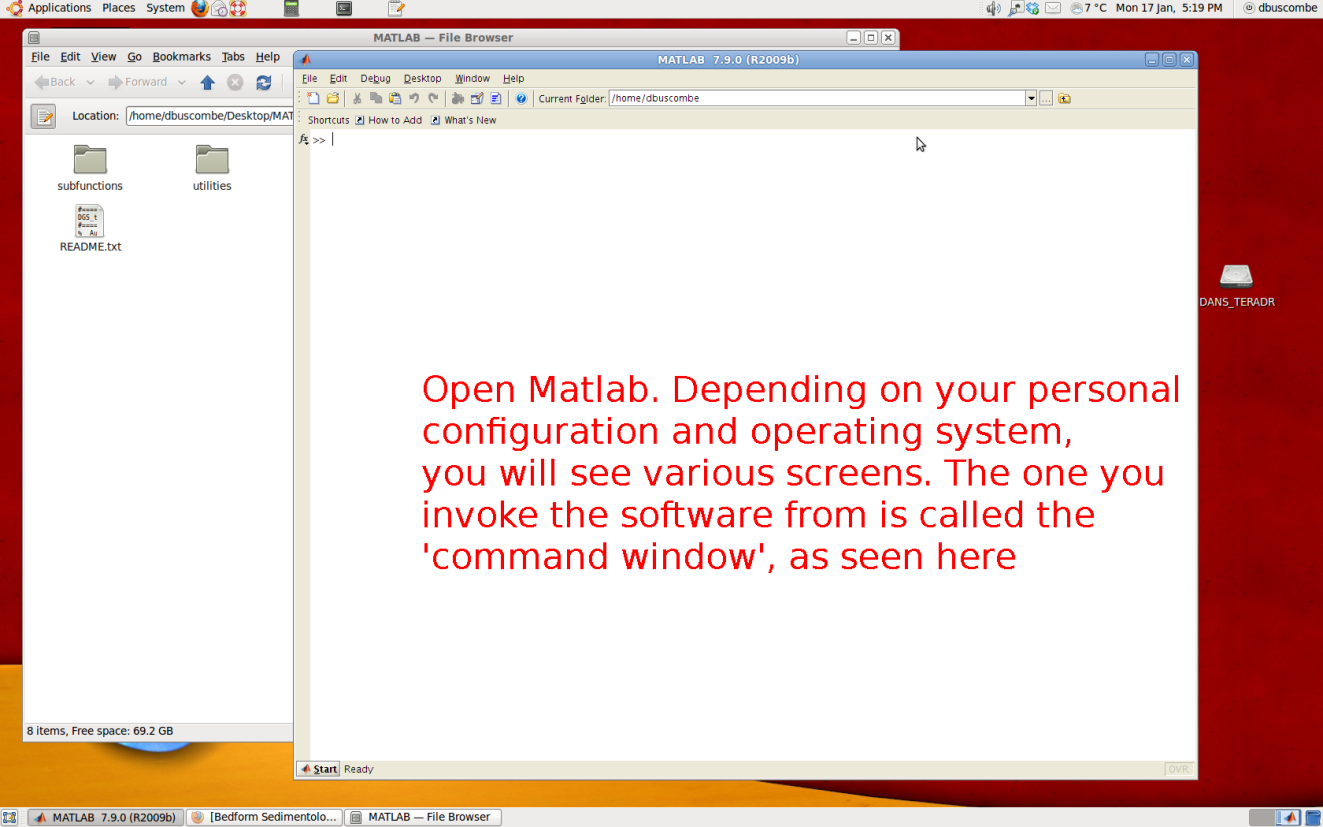
- read_me.rtf
- EyeballS_FINAL.m
- AutoCorrS_Vert.m
- vpix_JAW.txt
- JAW_calibdata_150.txt
- PlotGen_AC_Call.m
- crop_jpg2tif.m
- measure_mm2pix.m

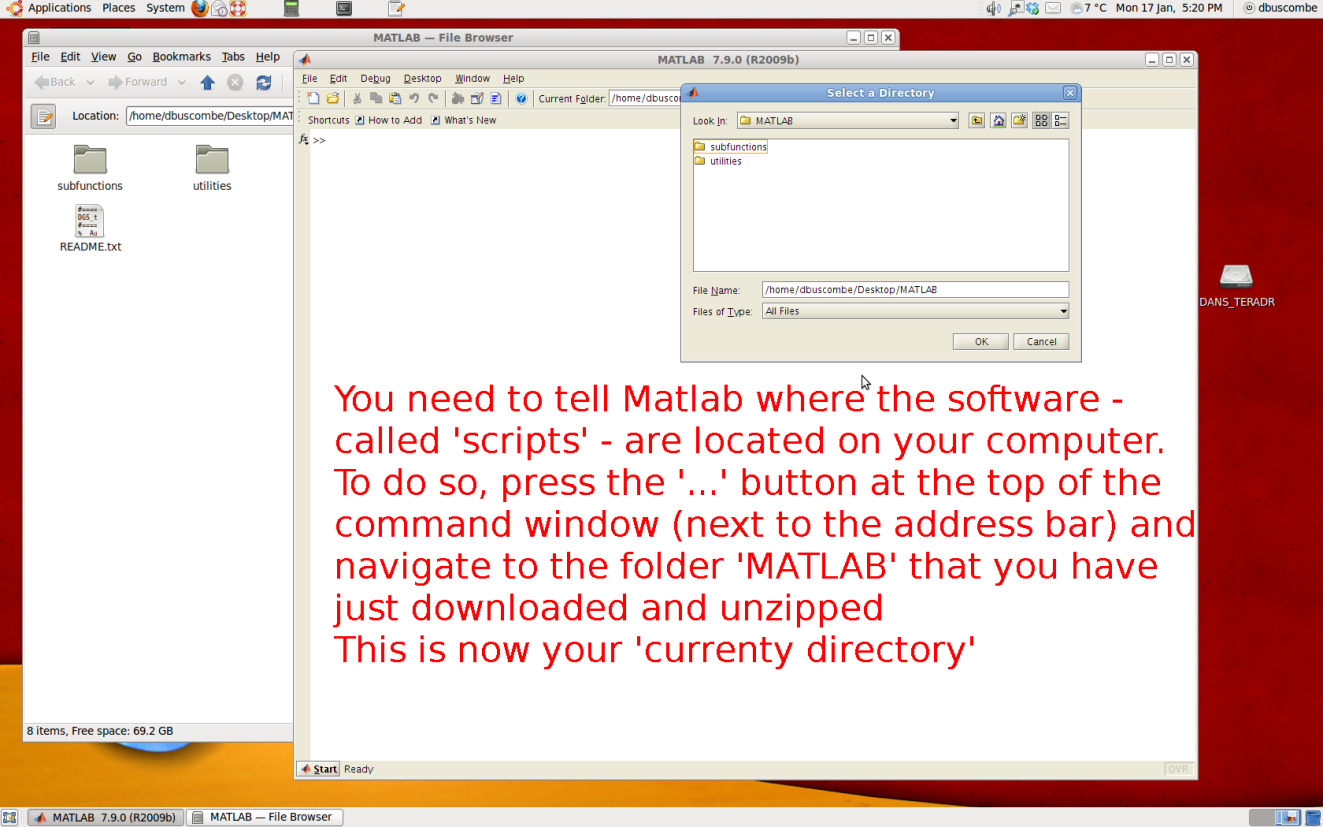


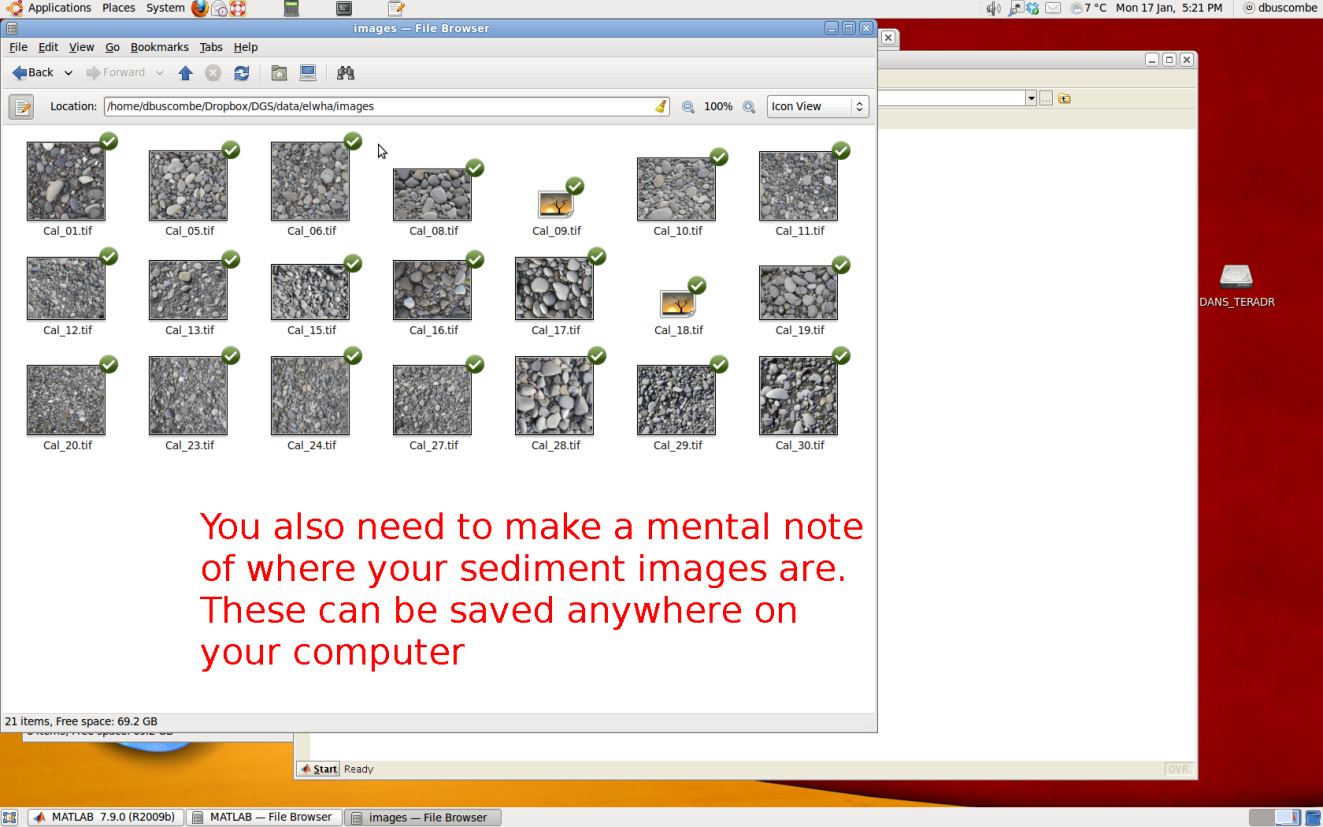
Save the zip file somewhere on your computer

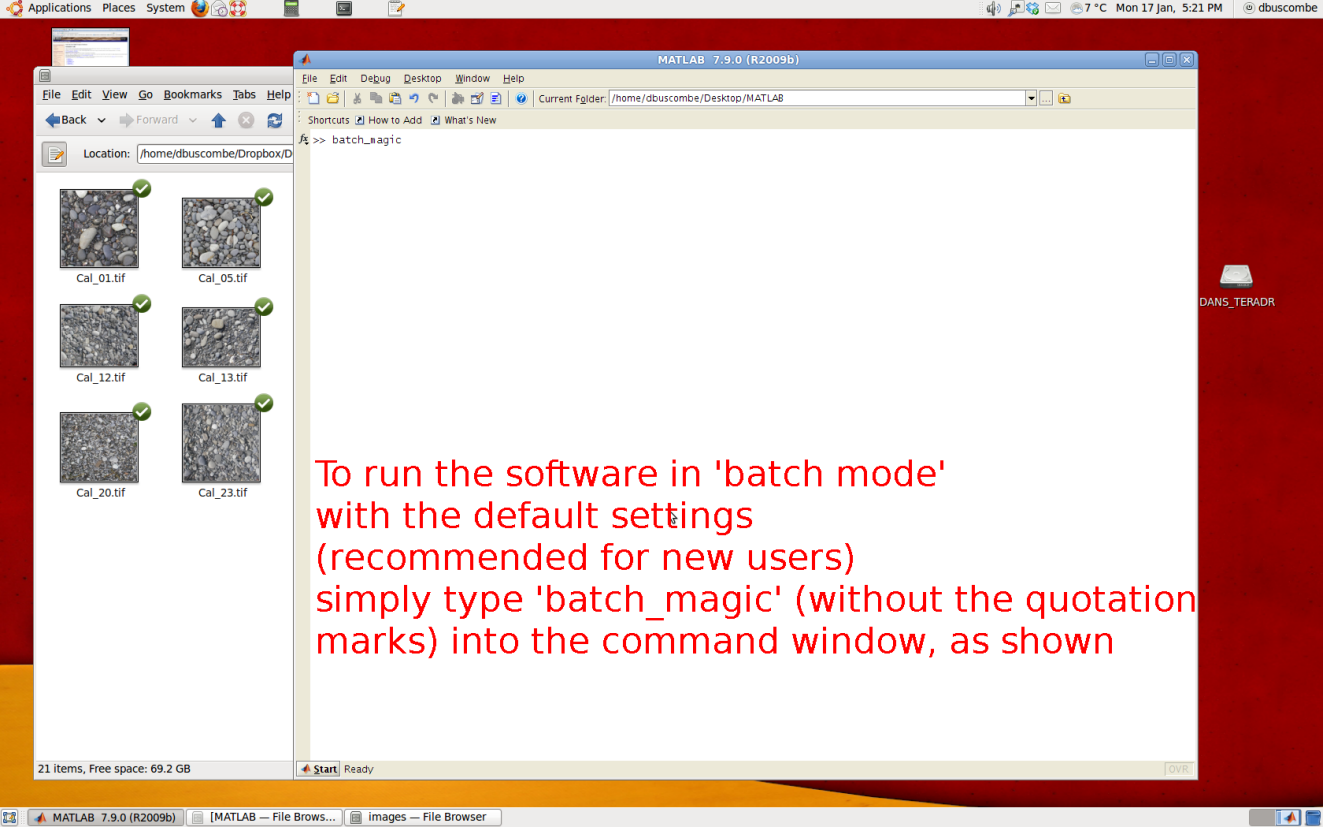

Applications Places System
7 °C Mon 17 Jan, 5:19 PM dbuscombe
DGS_toolbox_sep2010.zip
File Edit View Help
Open Extract
Back Location: /
Name Size Type Date Modified
R 25.2 KB Folder 06 June 2010, 04:59
PYTHON 20.2 KB Folder 06 June 2010, 05:05
MATLAB 149.8 KB Folder 03 September 2010, 17:20
Inside the zip file are 3 folders: one for R; one for Python; and one for Matlab software
You may choose to 'unzip' any one or all 3 of these folders
Note that R and python are free open-source and platform-independent software, and Matlab is proprietary (www.mathworks.com)
3 objects (195.1 KB)
DANS_TERADR
[MATLAB 7.9.0 (R2009...
[Bedform Sedimentolo...
DGS_toolbox_sep2010...

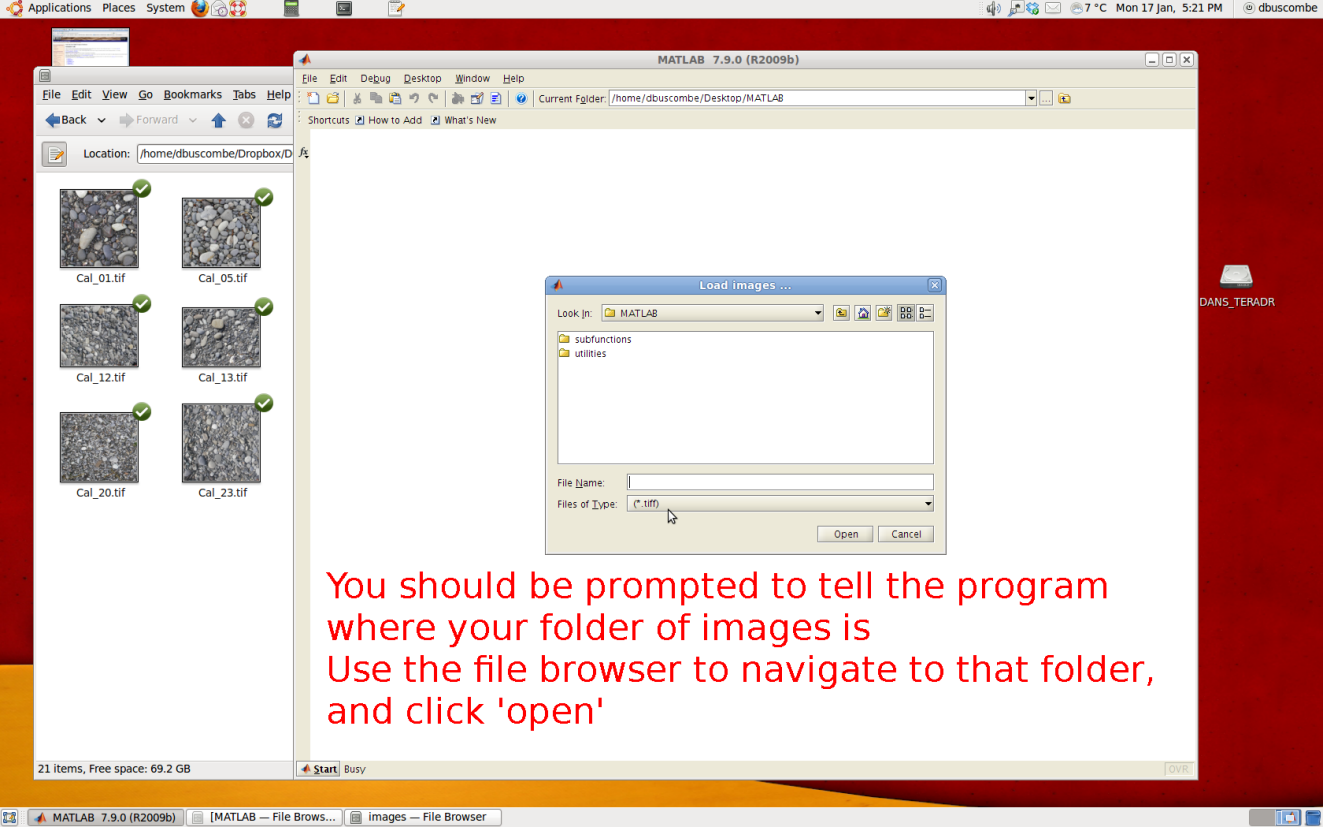

Applications Places System
7 °C Mon 17 Jan, 5:19 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MATLAB
100% Icon View
subfunctions
utilities
batch_calib.m
batch_magic.m
calibdata.txt
calib_grainsize.m
magic_grainsize.m
README.txt
DANS_TERADR
Inside the MATLAB folder you should see these files. This folder is your working folder - called a 'current directory' in Matlab - where you run the software from
8 items, Free space: 69.2 GB
[MATLAB 7.9.0 (R2009...
[Bedform Sedimentolo...
MATLAB — File Browser

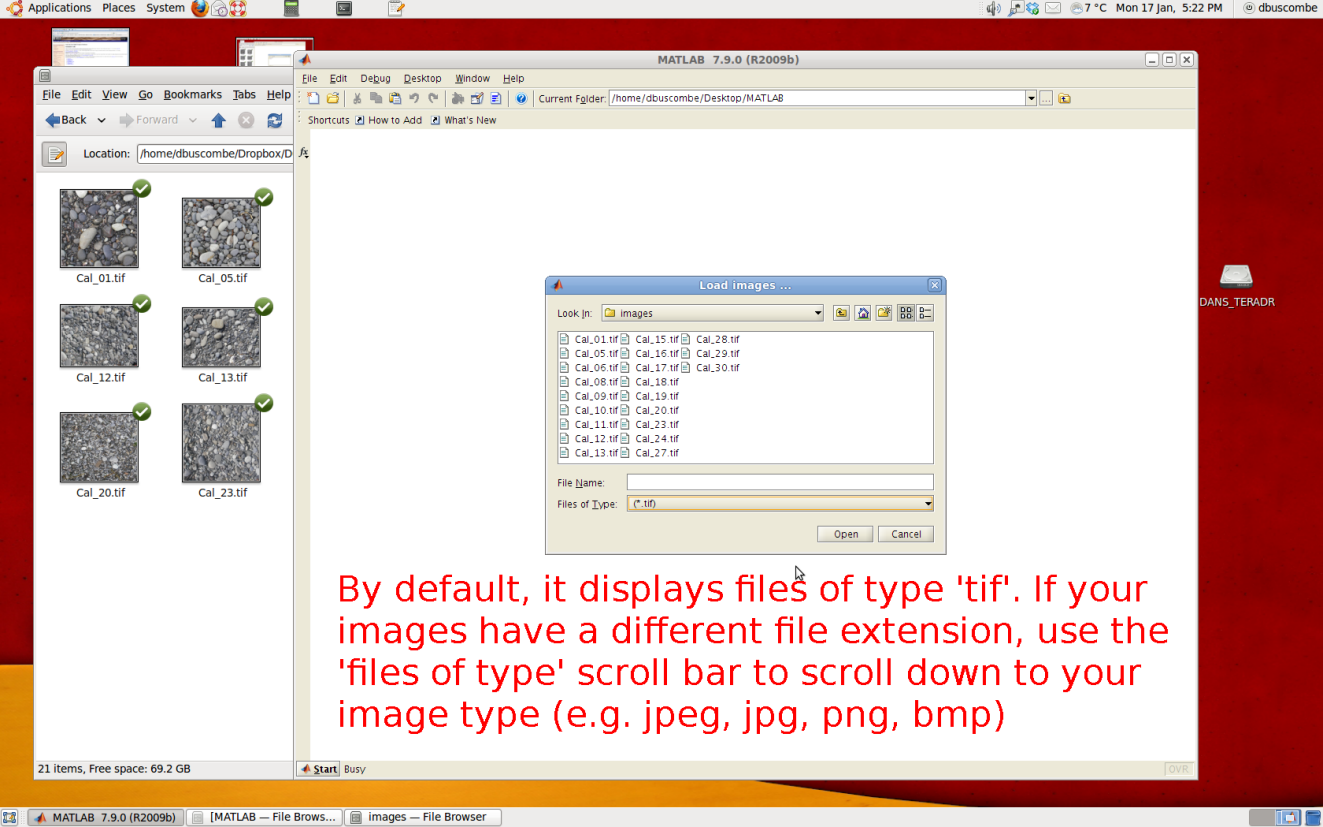

Applications Places System
7 °C Mon 17 Jan, 5:19 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe
Shortcuts How to Add What's New
fx >>
Start Ready
OVR
DANS_TERADR
Open Matlab. Depending on your personal configuration and operating system, you will see various screens. The one you invoke the software from is called the 'command window', as seen here
MATLAB 7.9.0 (R2009b)
[Bedform Sedimentolo...
MATLAB — File Browser

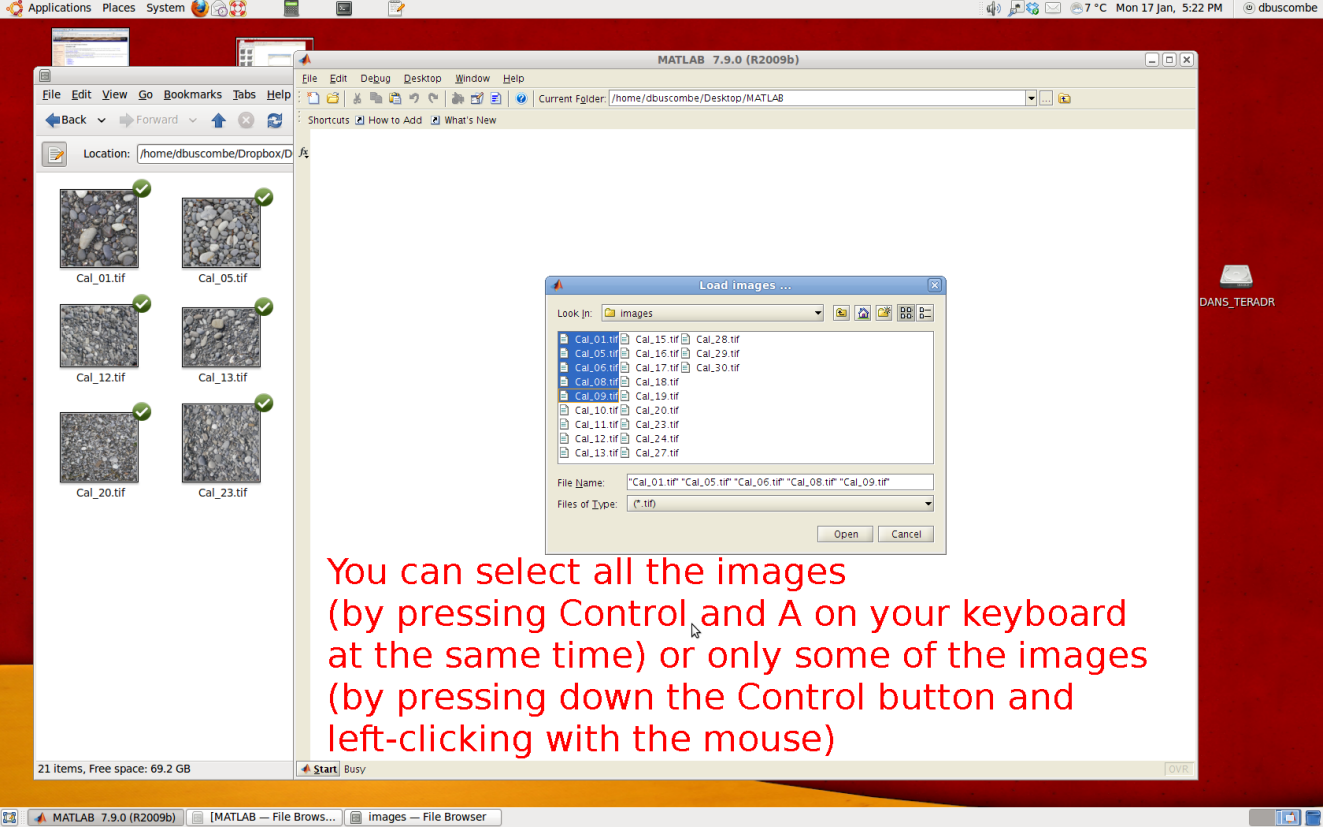

Applications Places System
7 °C Mon 17 Jan, 5:20 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbusco
Shortcuts How to Add What's New
fx >>
Start Ready
Select a Directory
Look In: MATLAB
subfunctions
utilities
File Name: /home/dbuscombe/Desktop/MATLAB
Files of Type: All Files
OK Cancel
DANS_TERADR
You need to tell Matlab where the software - called 'scripts' - are located on your computer.
To do so, press the '...' button at the top of the command window (next to the address bar) and navigate to the folder 'MATLAB' that you have just downloaded and unzipped
This is now your 'currenty directory'
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser

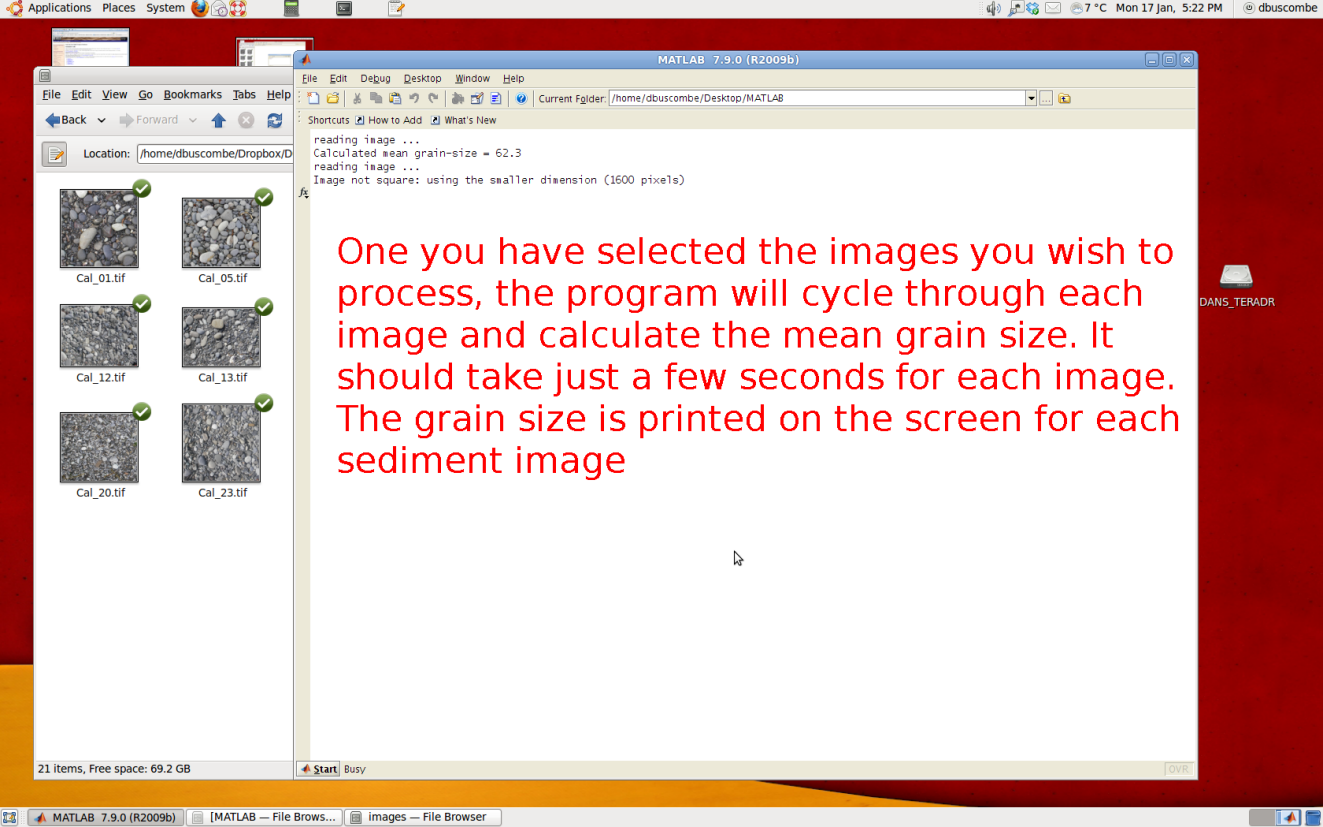

Applications Places System
7 °C Mon 17 Jan, 5:21 PM dbuscombe
images — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/DGS/data/elwha/images
100% Icon View
Cal_01.tif
Cal_05.tif
Cal_06.tif
Cal_08.tif
Cal_09.tif
Cal_10.tif
Cal_11.tif
Cal_12.tif
Cal_13.tif
Cal_15.tif
Cal_16.tif
Cal_17.tif
Cal_18.tif
Cal_19.tif
Cal_20.tif
Cal_23.tif
Cal_24.tif
Cal_27.tif
Cal_28.tif
Cal_29.tif
Cal_30.tif
You also need to make a mental note of where your sediment images are. These can be saved anywhere on your computer
21 items, Free space: 69.2 GB
DANS_TERADR
Start Ready
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
images — File Browser

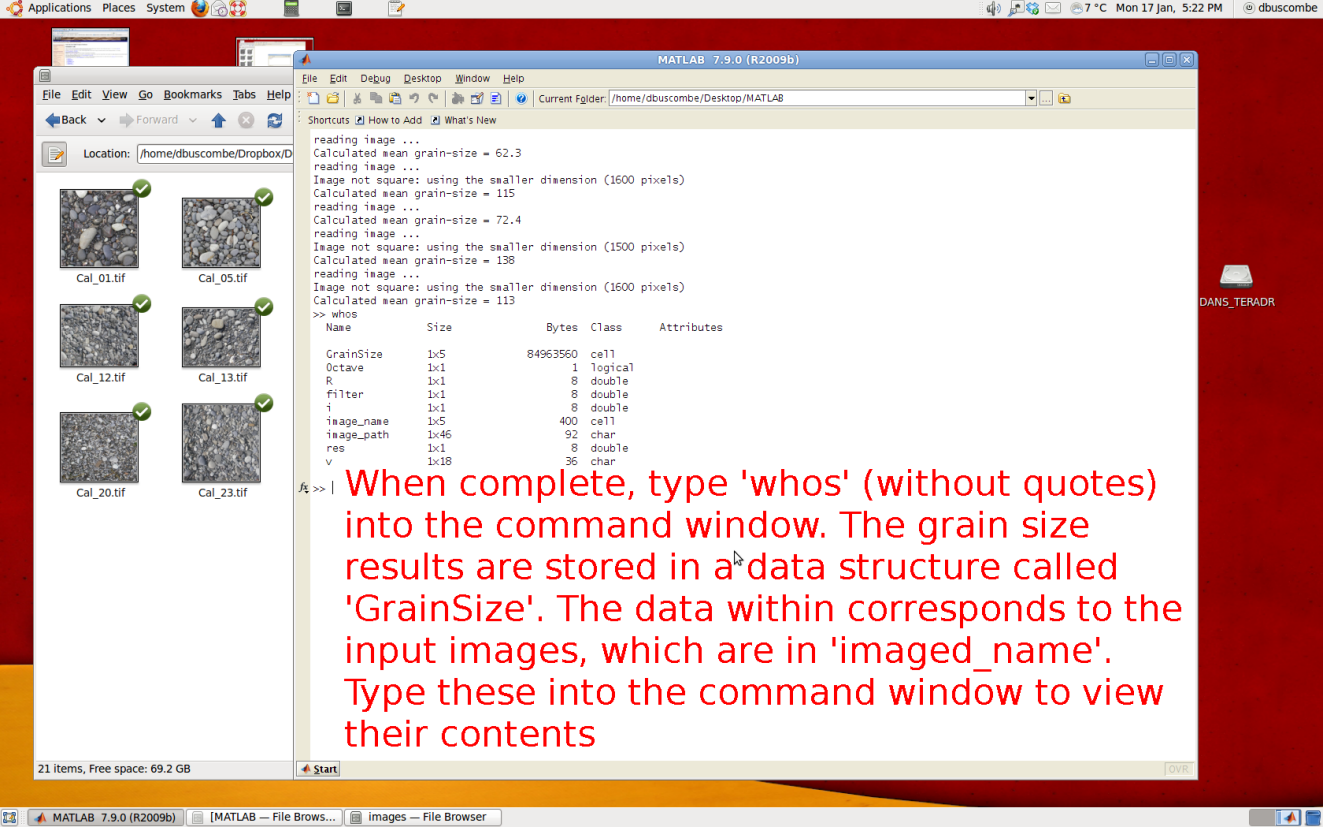

Applications Places System
7 °C Mon 17 Jan, 5:21 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
>> batch_magic
To run the software in 'batch mode'
with the default settings
(recommended for new users)
simply type 'batch_magic' (without the quotation
marks) into the command window, as shown
Start Ready
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser

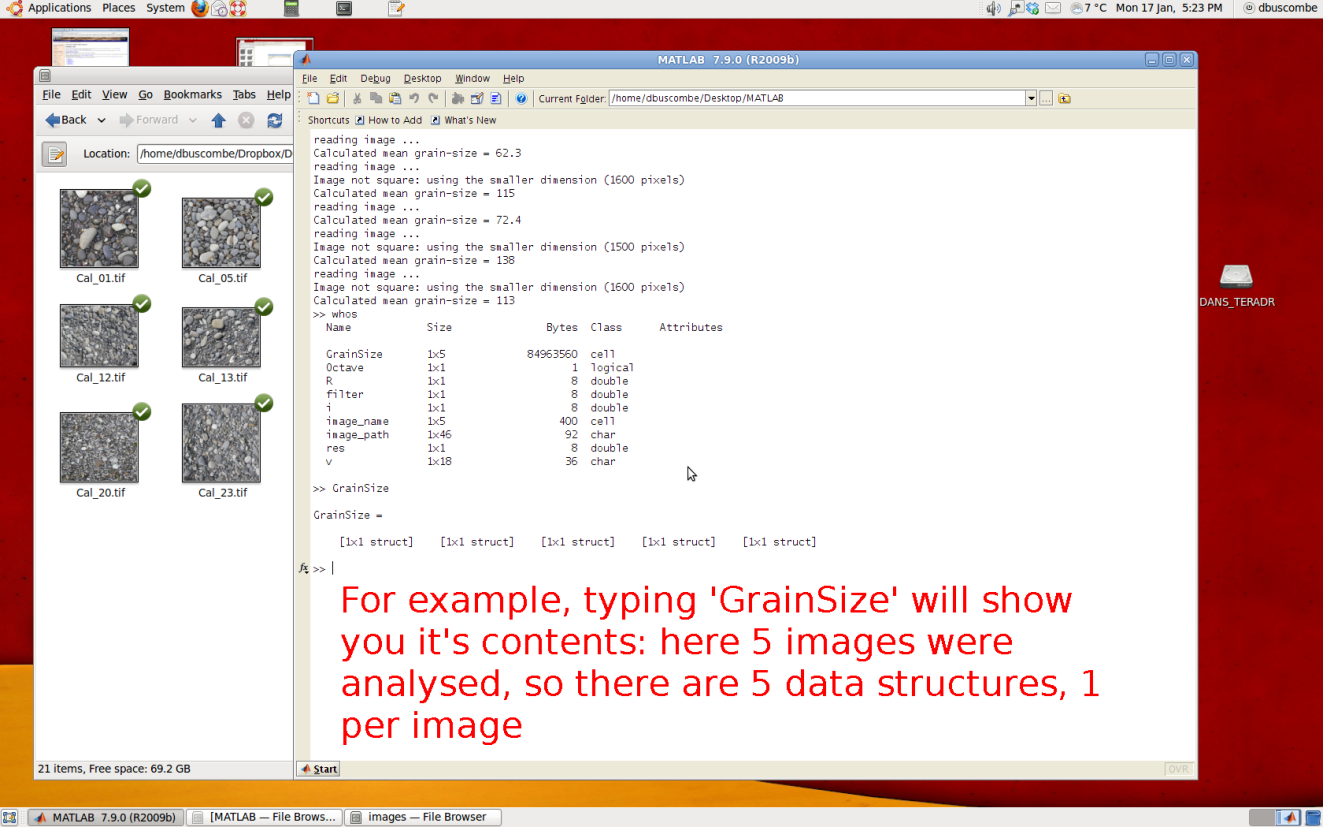

Applications Places System
7 °C Mon 17 Jan, 5:21 PM dbuscombe
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
Load images ...
Look In: MATLAB
subfunctions
utilities
File Name:
Files of Type: (*.tiff)
Open
Cancel
DANS_TERADR
You should be prompted to tell the program where your folder of images is
Use the file browser to navigate to that folder, and click 'open'
Start Busy
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser

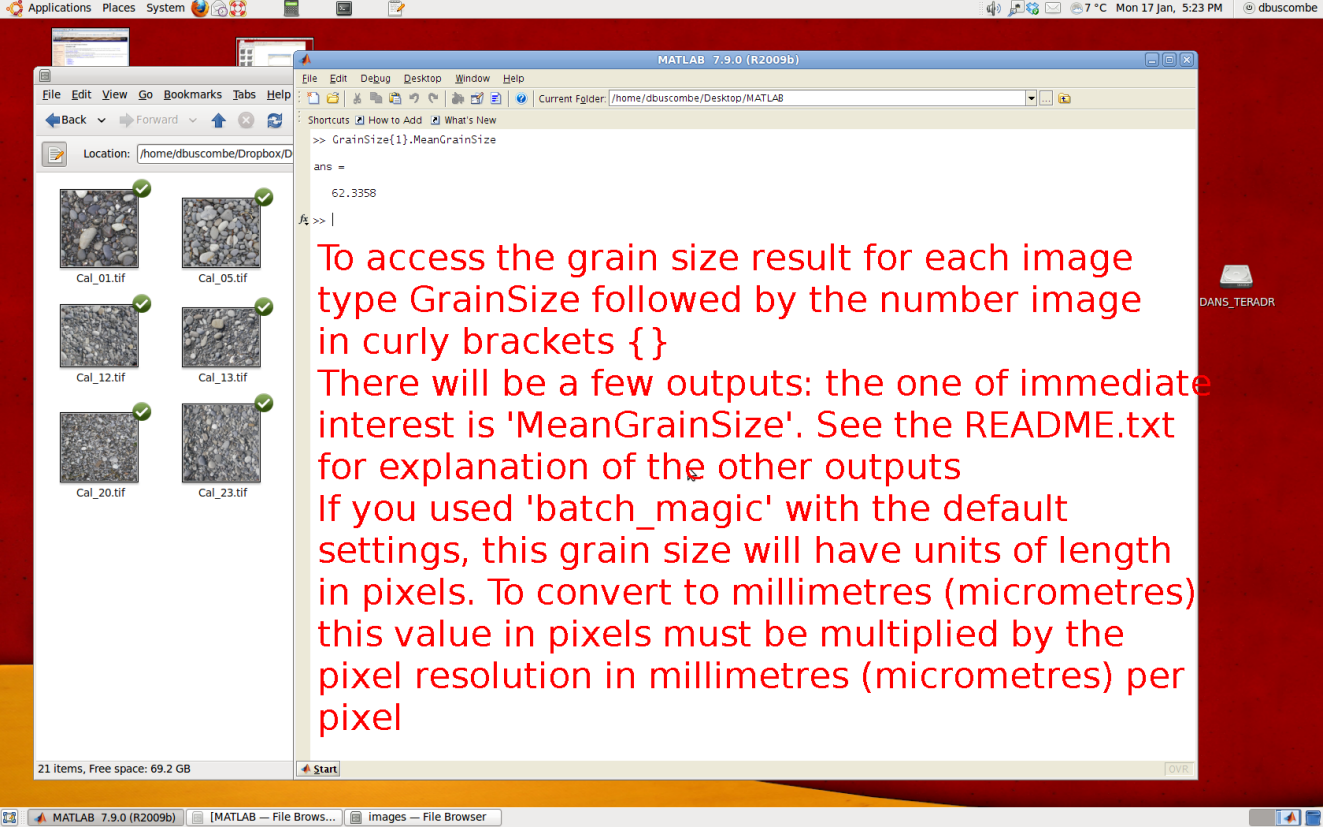

Applications Places System
7 °C Mon 17 Jan, 5:22 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
Load images ...
Look In: images
Cal_01.tif Cal_15.tif Cal_28.tif
Cal_05.tif Cal_16.tif Cal_29.tif
Cal_06.tif Cal_17.tif Cal_30.tif
Cal_08.tif Cal_18.tif
Cal_09.tif Cal_19.tif
Cal_10.tif Cal_20.tif
Cal_11.tif Cal_23.tif
Cal_12.tif Cal_24.tif
Cal_13.tif Cal_27.tif
File Name:
Files of Type: (*.tif)
Open Cancel
By default, it displays files of type 'tif'. If your images have a different file extension, use the 'files of type' scroll bar to scroll down to your image type (e.g. jpeg, jpg, png, bmp)
Start Busy
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser

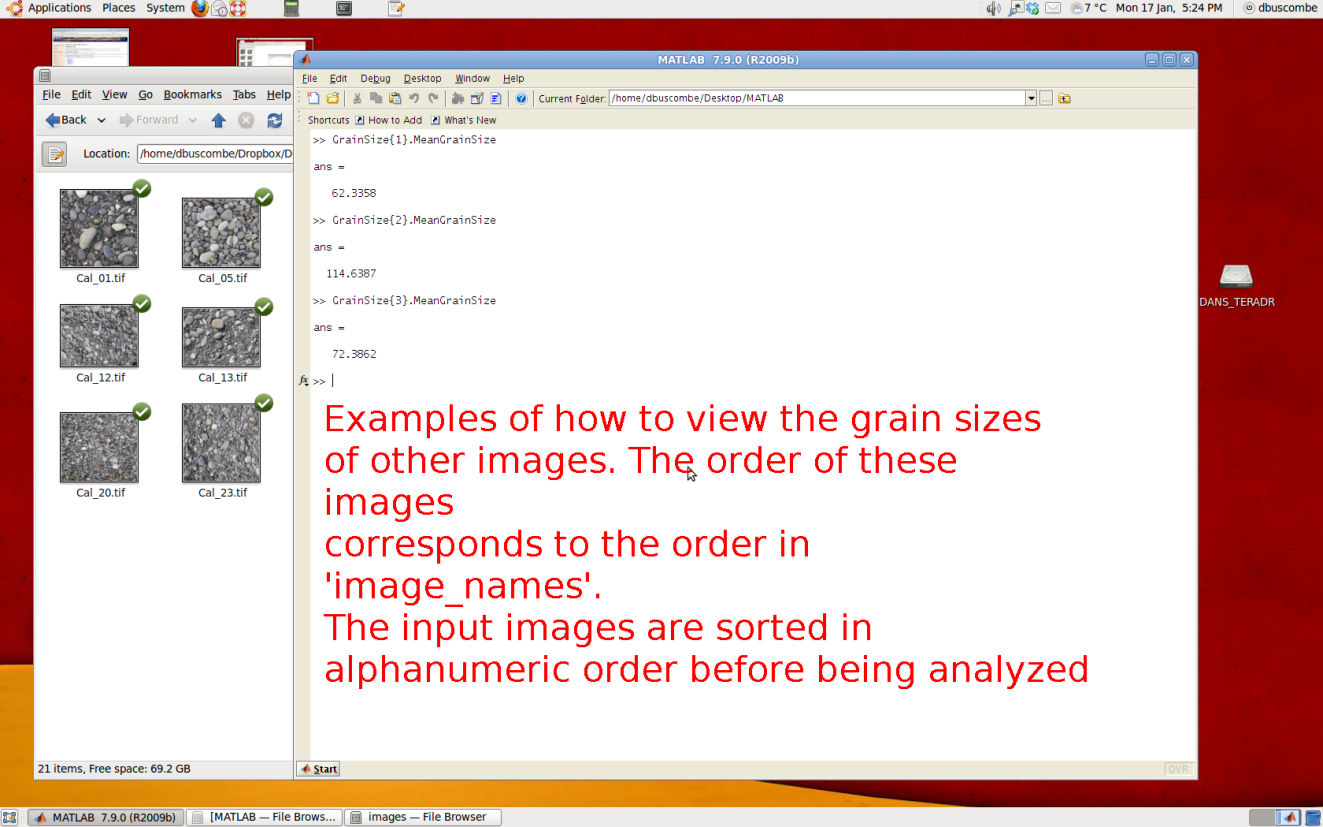

Applications Places System
7 °C Mon 17 Jan, 5:22 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
Load images ...
Look In: images
Cal_01.tif
Cal_05.tif
Cal_06.tif
Cal_08.tif
Cal_09.tif
Cal_10.tif
Cal_11.tif
Cal_12.tif
Cal_13.tif
Cal_15.tif
Cal_16.tif
Cal_17.tif
Cal_18.tif
Cal_19.tif
Cal_20.tif
Cal_23.tif
Cal_24.tif
Cal_27.tif
Cal_28.tif
Cal_29.tif
Cal_30.tif
File Name: "Cal_01.tif" "Cal_05.tif" "Cal_06.tif" "Cal_08.tif" "Cal_09.tif"
Files of Type: (*.tif)
Open
Cancel
You can select all the images
(by pressing Control and A on your keyboard
at the same time) or only some of the images
(by pressing down the Control button and
left-clicking with the mouse)
Start Busy
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser


Applications Places System
7 °C Mon 17 Jan, 5:22 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
reading image ...
Calculated mean grain-size = 62.3
reading image ...
Image not square: using the smaller dimension (1600 pixels)
One you have selected the images you wish to process, the program will cycle through each image and calculate the mean grain size. It should take just a few seconds for each image. The grain size is printed on the screen for each sediment image
Start Busy
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser


Applications Places System
7 °C Mon 17 Jan, 5:22 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
reading image ...
Calculated mean grain-size = 62.3
reading image ...
Image not square: using the smaller dimension (1600 pixels)
Calculated mean grain-size = 115
reading image ...
Calculated mean grain-size = 72.4
reading image ...
Image not square: using the smaller dimension (1500 pixels)
Calculated mean grain-size = 138
reading image ...
Image not square: using the smaller dimension (1600 pixels)
Calculated mean grain-size = 113
>> whos
Name Size Bytes Class Attributes
GrainSize 1x5 84963560 cell
Octave 1x1 1 logical
R 1x1 8 double
filter 1x1 8 double
i 1x1 8 double
image_name 1x5 400 cell
image_path 1x46 92 char
res 1x1 8 double
v 1x18 36 char
>>
When complete, type 'whos' (without quotes) into the command window. The grain size results are stored in a data structure called 'GrainSize'. The data within corresponds to the input images, which are in 'imaged_name'. Type these into the command window to view their contents
Start
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser


Applications Places System
7 °C Mon 17 Jan, 5:23 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
reading image ...
Calculated mean grain-size = 62.3
reading image ...
Image not square: using the smaller dimension (1600 pixels)
Calculated mean grain-size = 115
reading image ...
Calculated mean grain-size = 72.4
reading image ...
Image not square: using the smaller dimension (1500 pixels)
Calculated mean grain-size = 138
reading image ...
Image not square: using the smaller dimension (1600 pixels)
Calculated mean grain-size = 113
>> whos
Name Size Bytes Class Attributes
GrainSize 1x5 84963560 cell
Octave 1x1 1 logical
R 1x1 8 double
filter 1x1 8 double
i 1x1 8 double
image_name 1x5 400 cell
image_path 1x46 92 char
res 1x1 8 double
v 1x18 36 char
>> GrainSize
GrainSize =
[1x1 struct] [1x1 struct] [1x1 struct] [1x1 struct] [1x1 struct]
>>
Start
DANS_TERADR
For example, typing 'GrainSize' will show you it's contents: here 5 images were analysed, so there are 5 data structures, 1 per image
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser

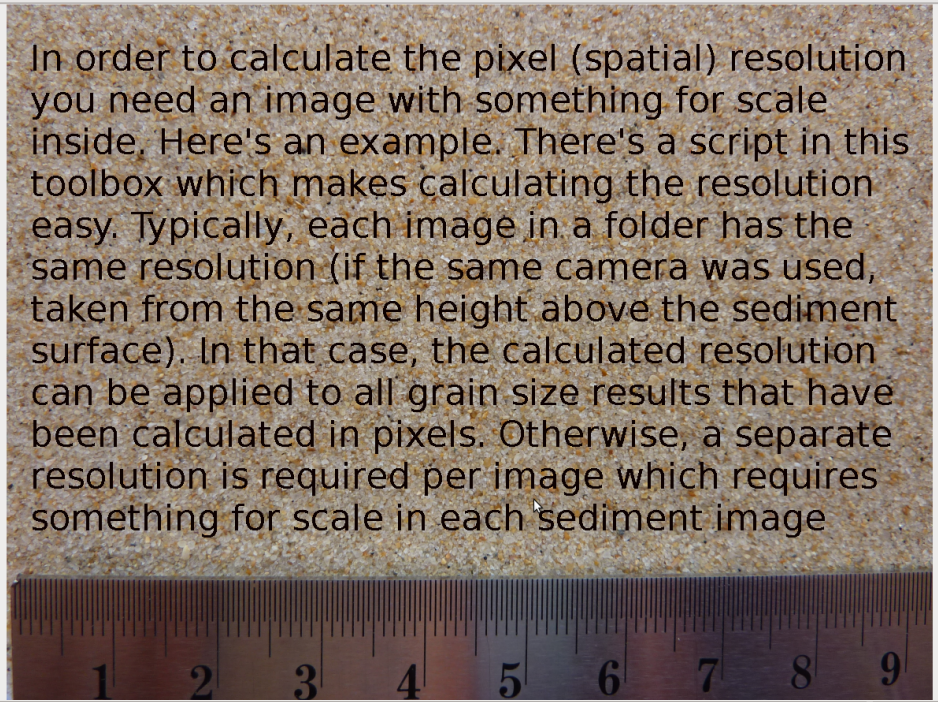

Applications Places System
7 °C Mon 17 Jan, 5:23 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
>> GrainSize{1}.MeanGrainSize
ans =
62.3358
>>
To access the grain size result for each image type GrainSize followed by the number image in curly brackets { }
There will be a few outputs: the one of immediate interest is 'MeanGrainSize'. See the README.txt for explanation of the other outputs
If you used 'batch_magic' with the default settings, this grain size will have units of length in pixels. To convert to millimetres (micrometres) this value in pixels must be multiplied by the pixel resolution in millimetres (micrometres) per pixel
Start
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser


Applications Places System
7 °C Mon 17 Jan, 5:24 PM dbuscombe
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/D
Cal_01.tif
Cal_05.tif
Cal_12.tif
Cal_13.tif
Cal_20.tif
Cal_23.tif
21 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
>> GrainSize{1}.MeanGrainSize
ans =
62.3358
>> GrainSize{2}.MeanGrainSize
ans =
114.6387
>> GrainSize{3}.MeanGrainSize
ans =
72.3862
>>
Examples of how to view the grain sizes of other images. The order of these images corresponds to the order in 'image_names'.
The input images are sorted in alphanumeric order before being analyzed
Start
DANS_TERADR
MATLAB 7.9.0 (R2009b)
[MATLAB — File Brows...
images — File Browser

P1020792.JPG

File Edit View Image Go Help

Previous Next



2560 x 1920 pixels 3.5 MB 46% 1 / 2

File Edit View Go

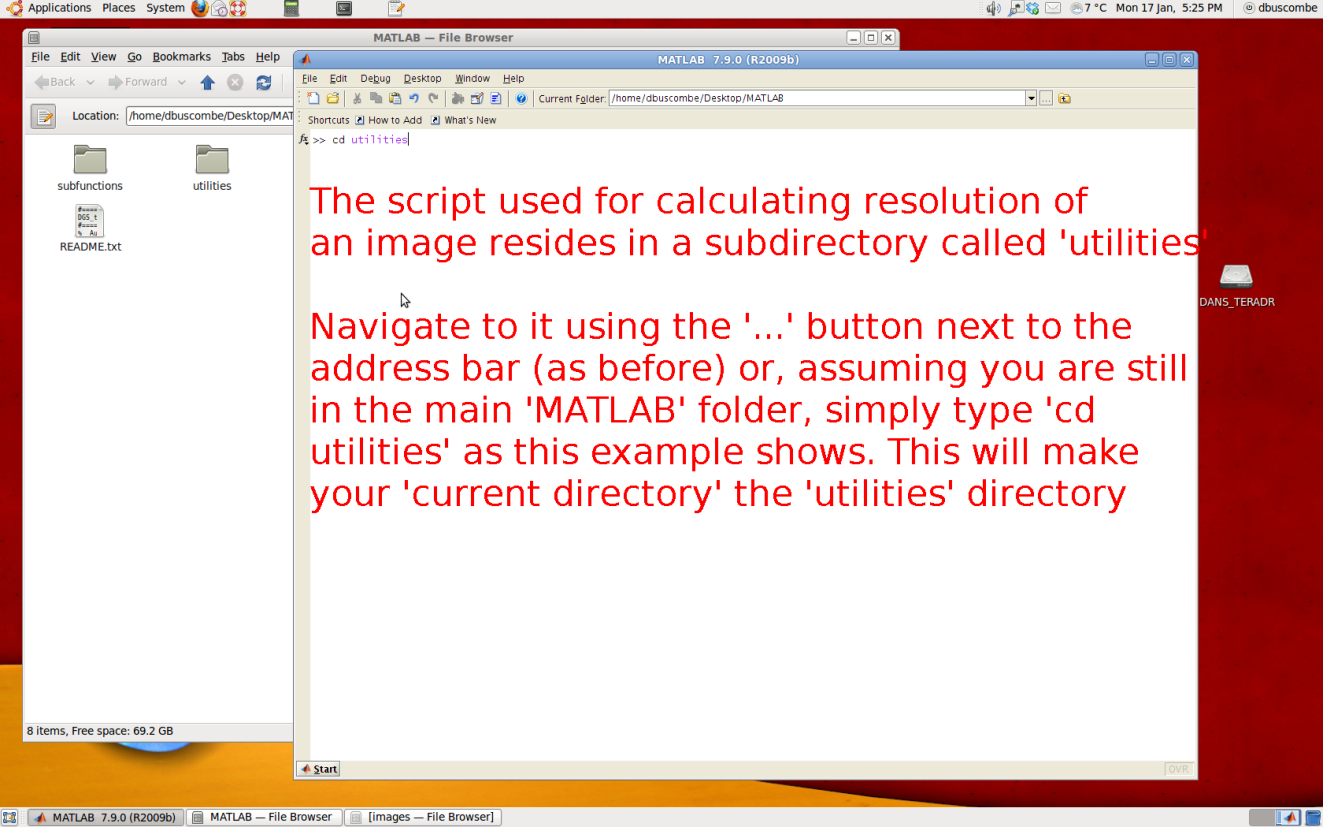
Back Forwa

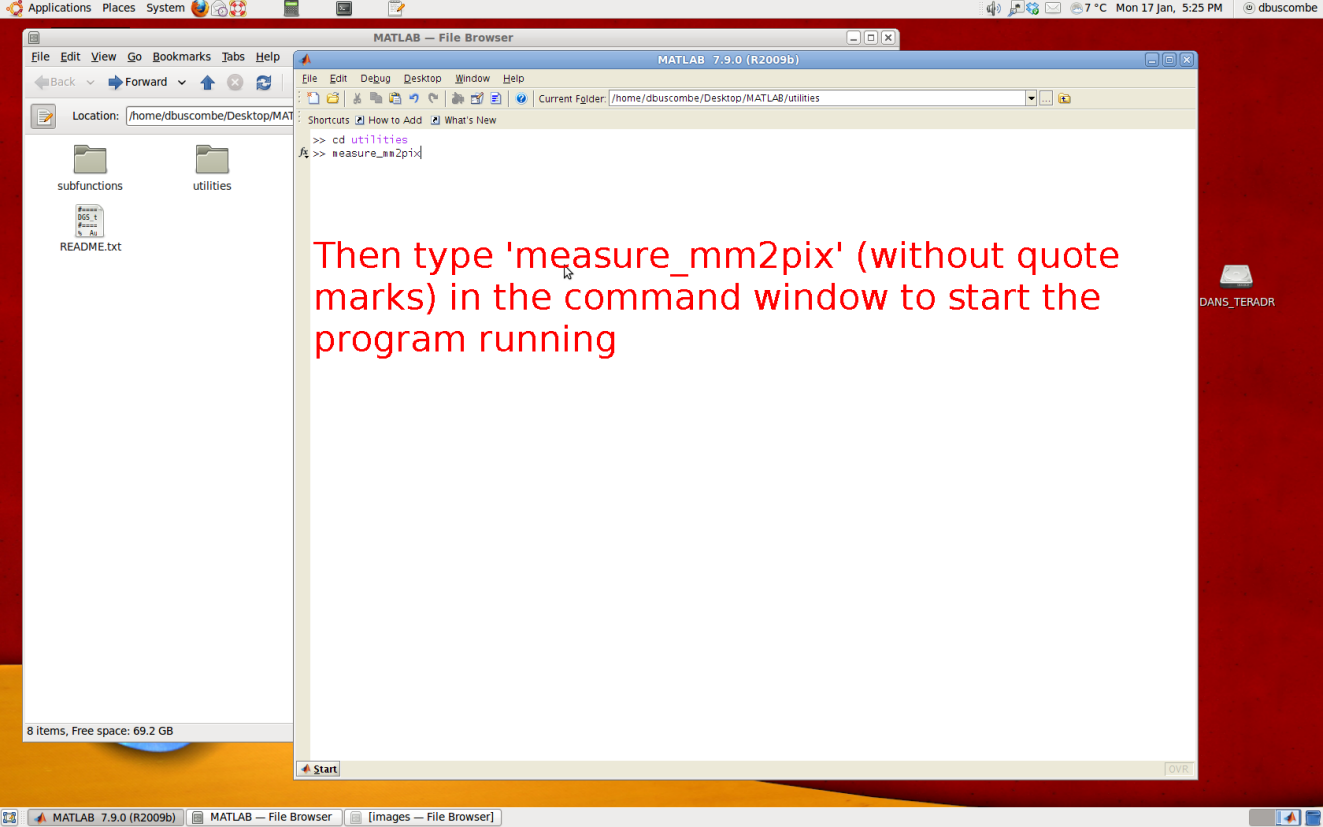
Location: /hom

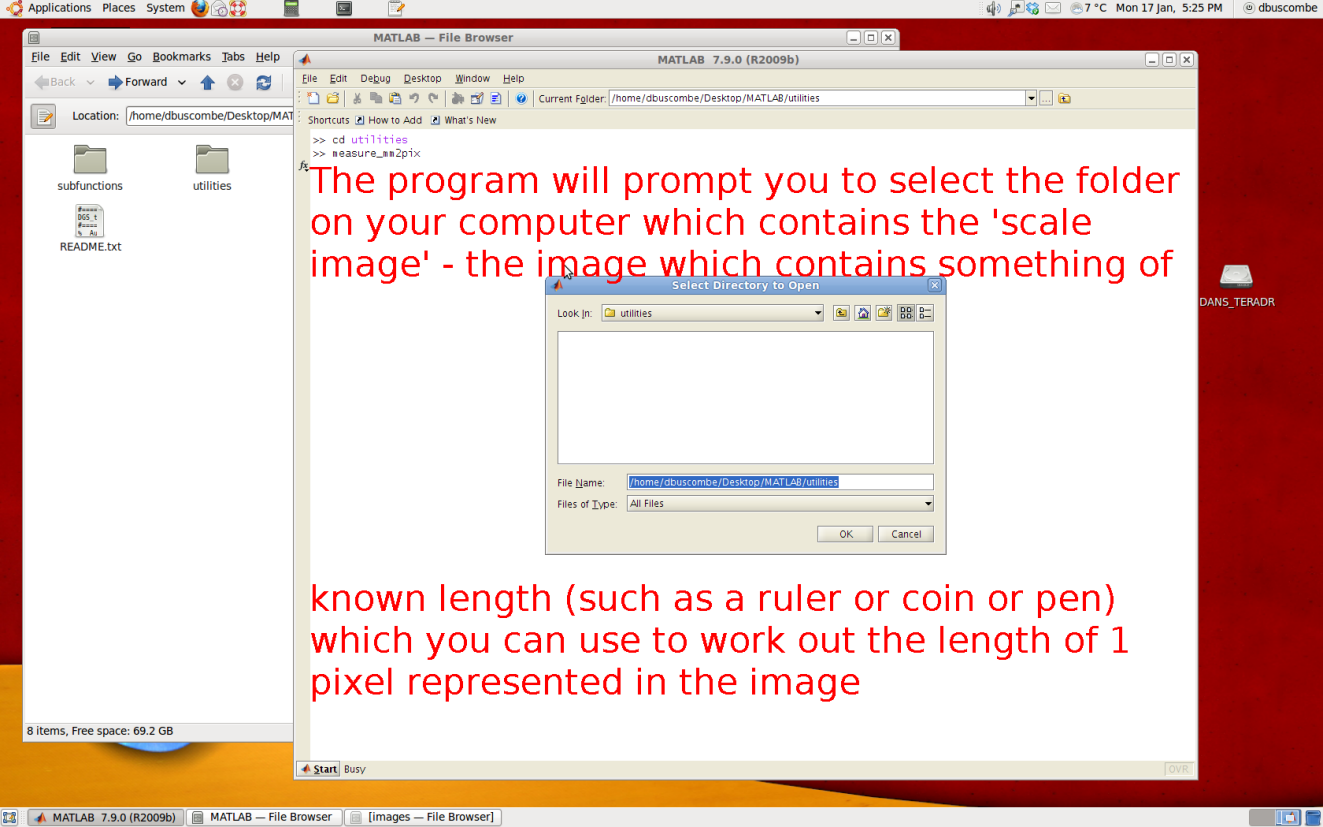
P1020792.JPG

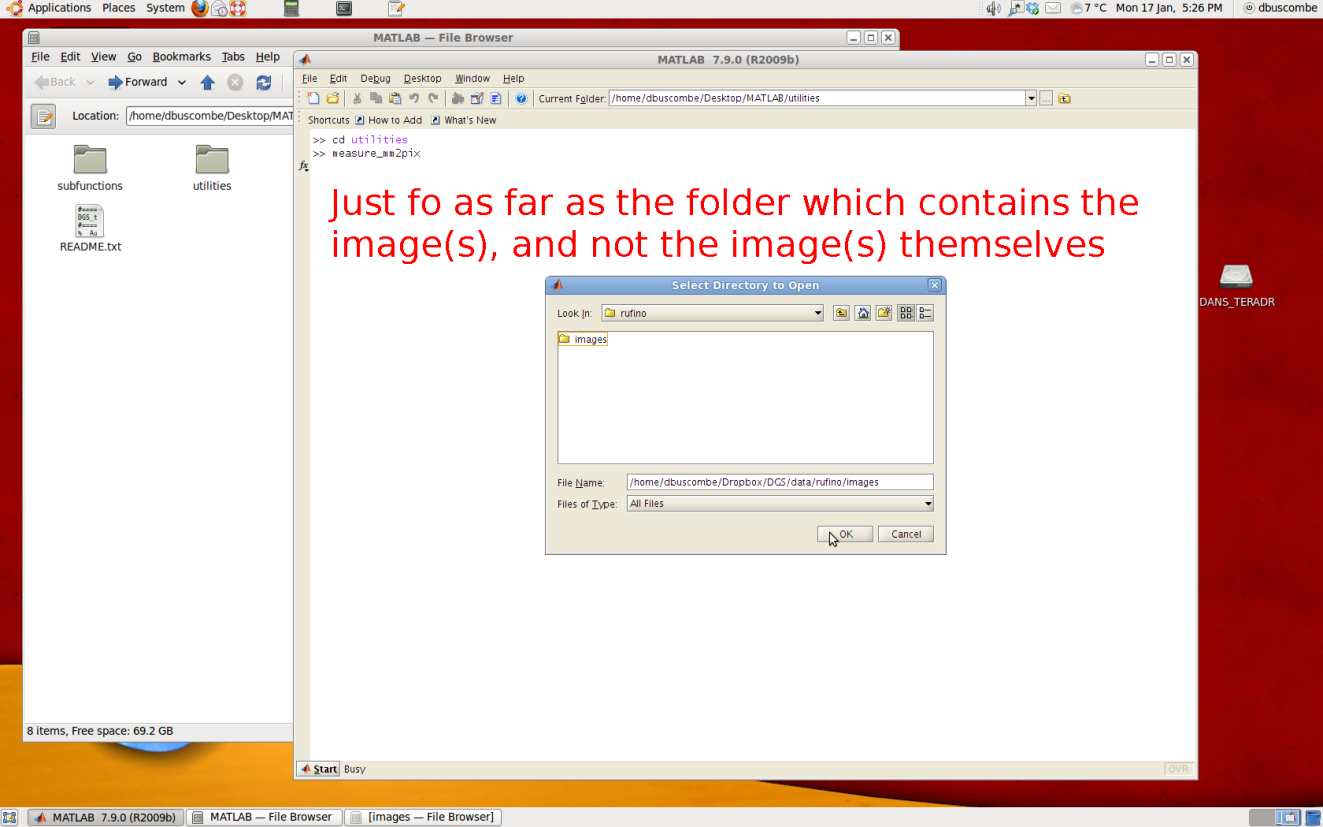
"P1020792.JPG" selected

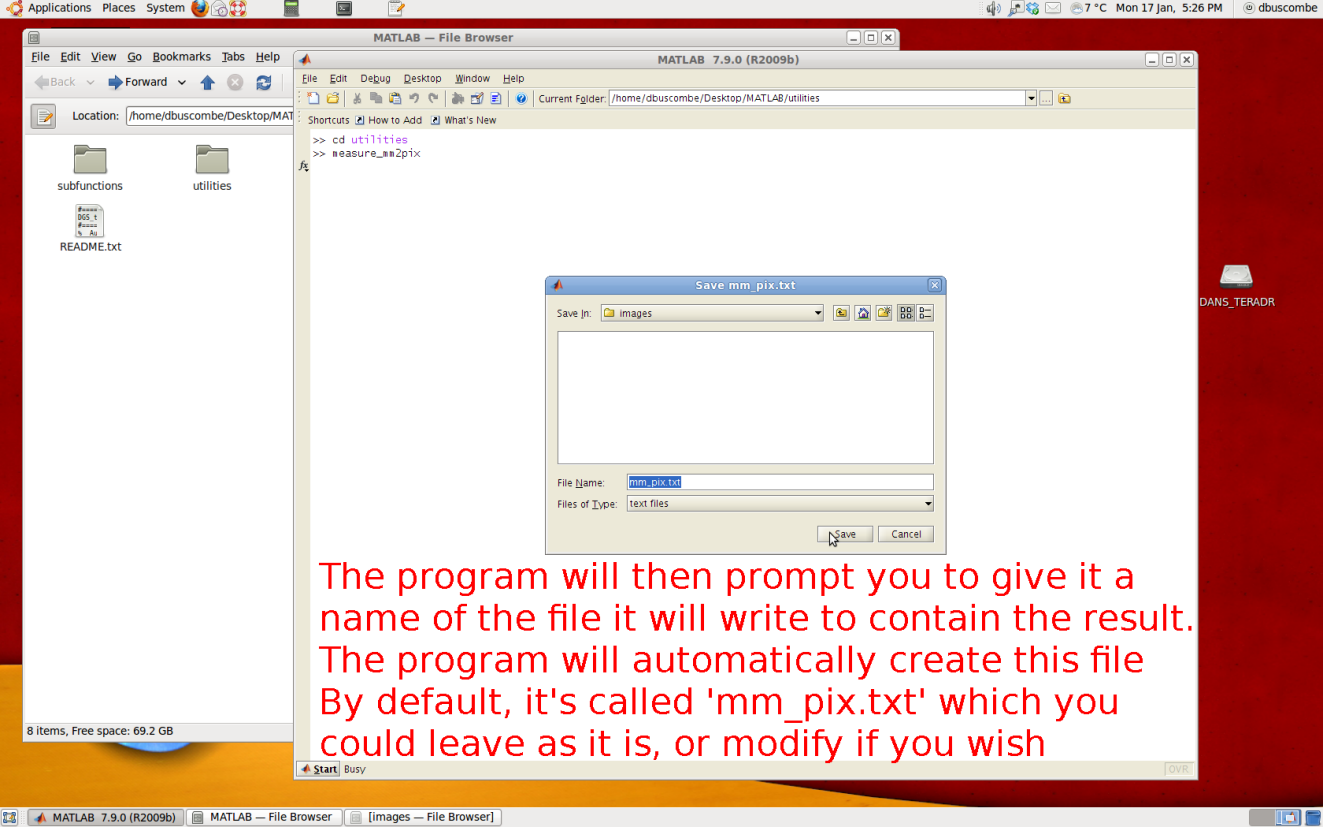
DANS_TERADR

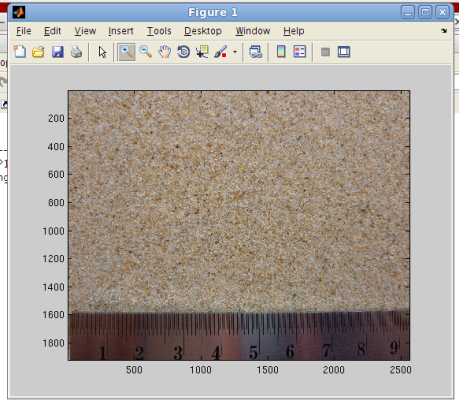

Applications Places System
7 °C Mon 17 Jan, 5:25 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB
Shortcuts How to Add What's New
>> cd utilities
The script used for calculating resolution of an image resides in a subdirectory called 'utilities'
Navigate to it using the '...' button next to the address bar (as before) or, assuming you are still in the main 'MATLAB' folder, simply type 'cd utilities' as this example shows. This will make your 'current directory' the 'utilities' directory
Start
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]


Applications Places System
7 °C Mon 17 Jan, 5:25 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB/utilities
Shortcuts How to Add What's New
>> cd utilities
>> measure_mm2pix
Then type 'measure_mm2pix' (without quote marks) in the command window to start the program running
Start
OVR
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]

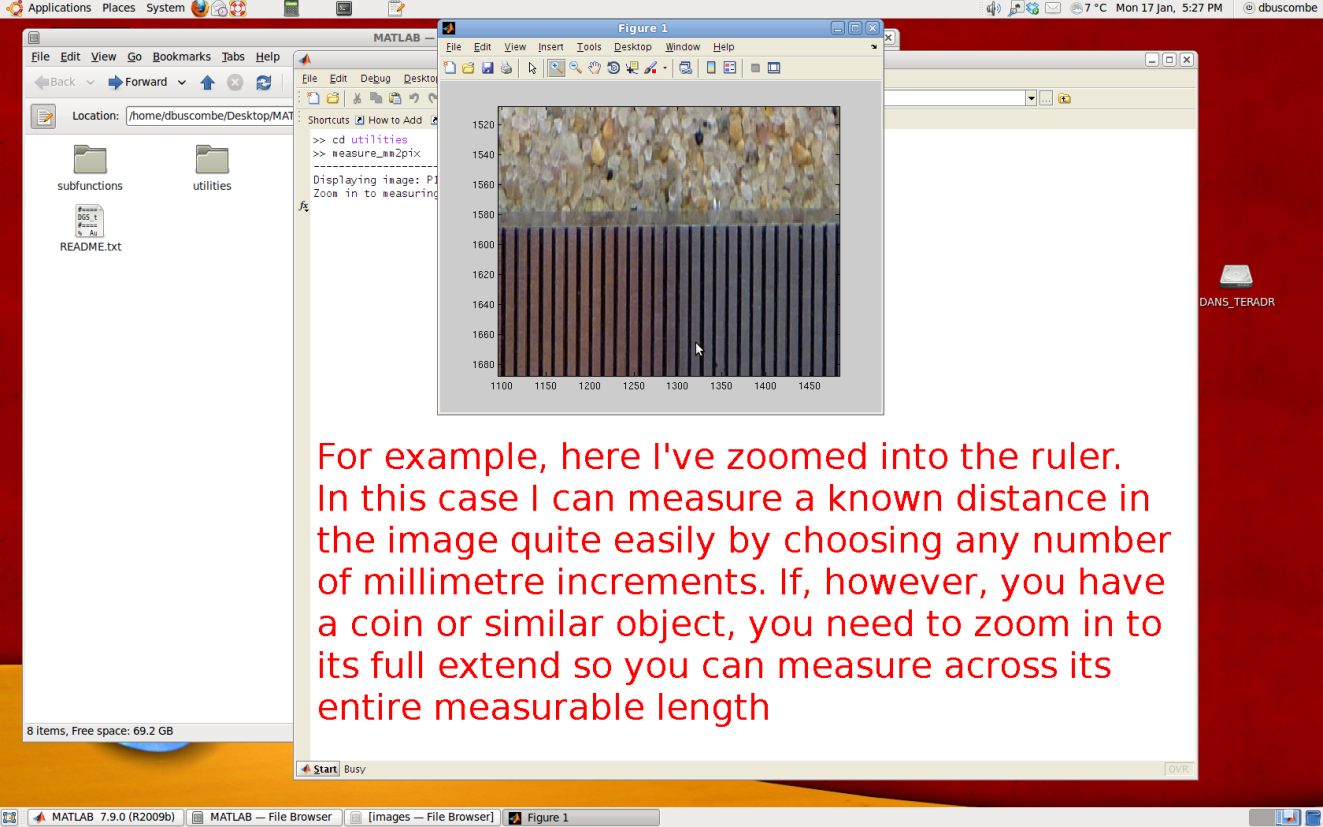

Applications Places System
7 °C Mon 17 Jan, 5:25 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB/utilities
Shortcuts How to Add What's New
>> cd utilities
>> measure_mm2pix
The program will prompt you to select the folder on your computer which contains the 'scale image' - the image which contains something of
Select Directory to Open
Look In: utilities
File Name: /home/dbuscombe/Desktop/MATLAB/utilities
Files of Type: All Files
OK
Cancel
known length (such as a ruler or coin or pen) which you can use to work out the length of 1 pixel represented in the image
Start Busy
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]

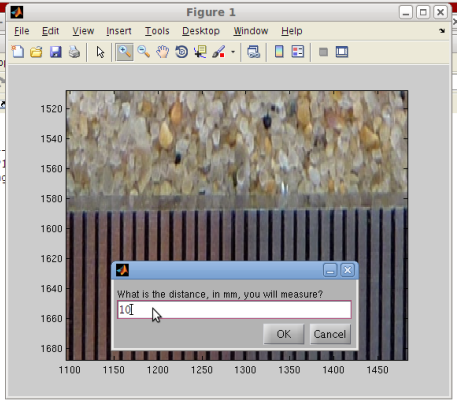

Applications Places System
7 °C Mon 17 Jan, 5:26 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB/utilities
Shortcuts How to Add What's New
>> cd utilities
>> measure_mm2pix
Just fo as far as the folder which contains the image(s), and not the image(s) themselves
Select Directory to Open
Look In: rufino
images
File Name: /home/dbuscombe/Dropbox/DGS/data/rufino/images
Files of Type: All Files
OK
Cancel
DANS_TERADR
Start Busy
OVR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]


Applications Places System
7 °C Mon 17 Jan, 5:26 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB/utilities
Shortcuts How to Add What's New
>> cd utilities
>> measure_mm2pix
Save mm_pix.txt
Save In: images
File Name: mm_pix.txt
Files of Type: text files
Save
Cancel
The program will then prompt you to give it a name of the file it will write to contain the result.
The program will automatically create this file
By default, it's called 'mm_pix.txt' which you could leave as it is, or modify if you wish
Start Busy
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]

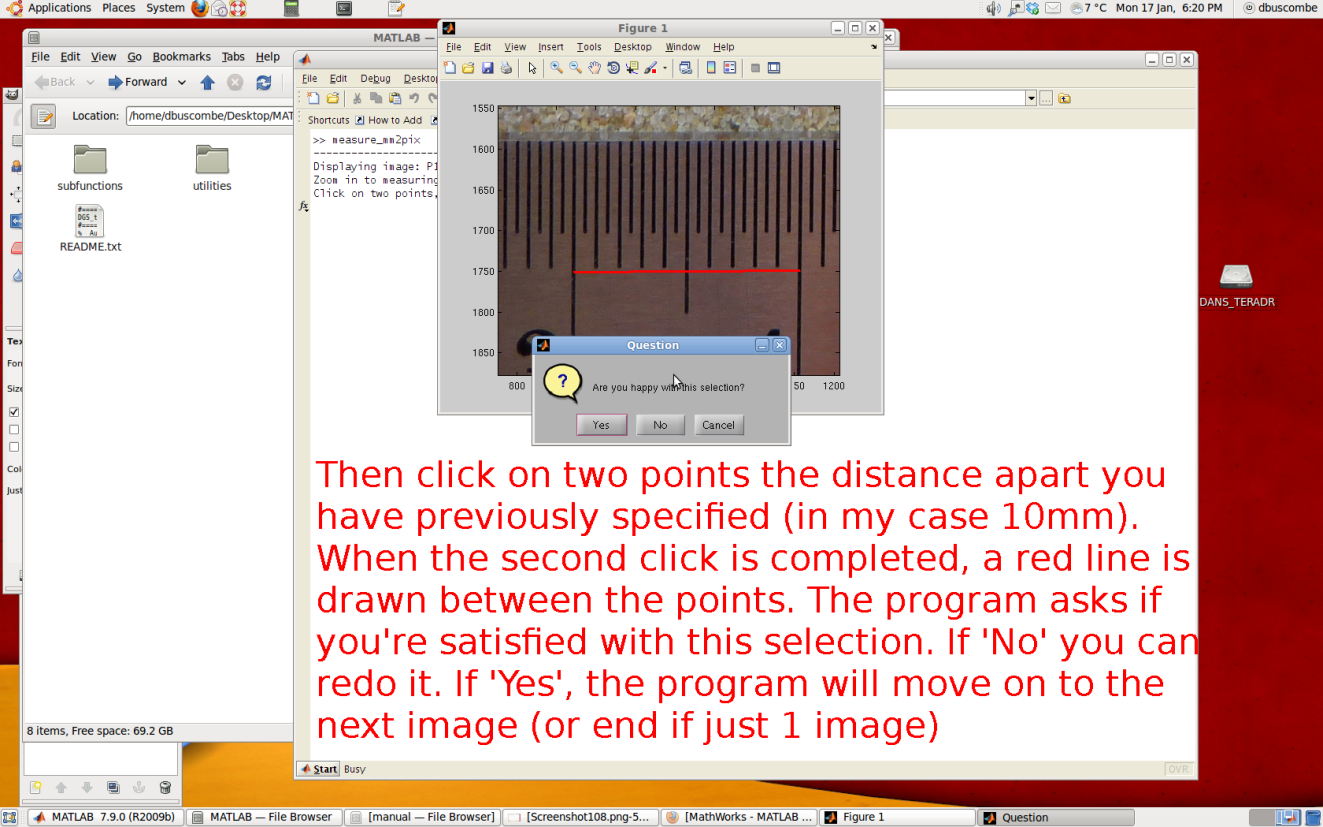


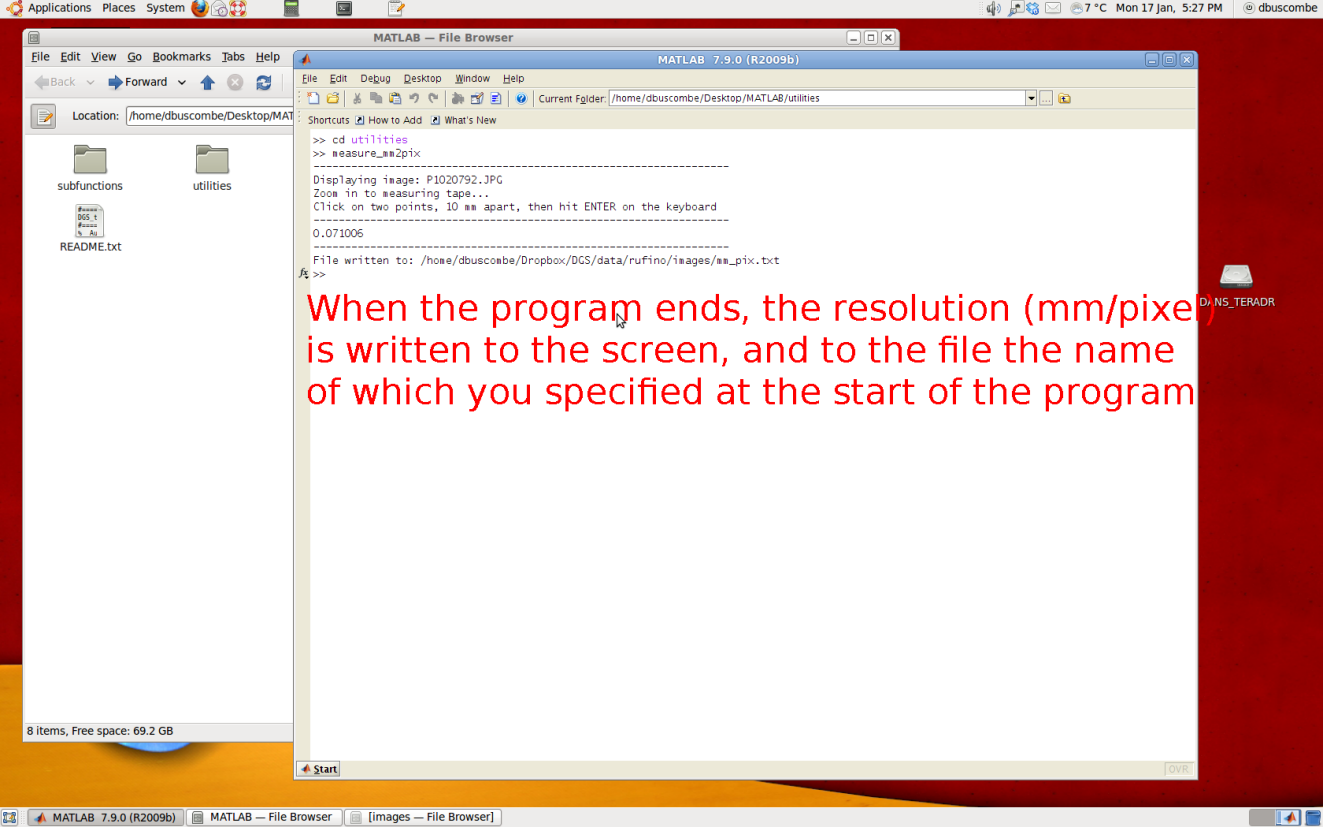
Then the cursor will turn into a 'in zoom' cross-hairs when hovered over the image. The program expects you to zoom in to the part of the image which contains your object for scale. You can only do this once so you need to get it right first time

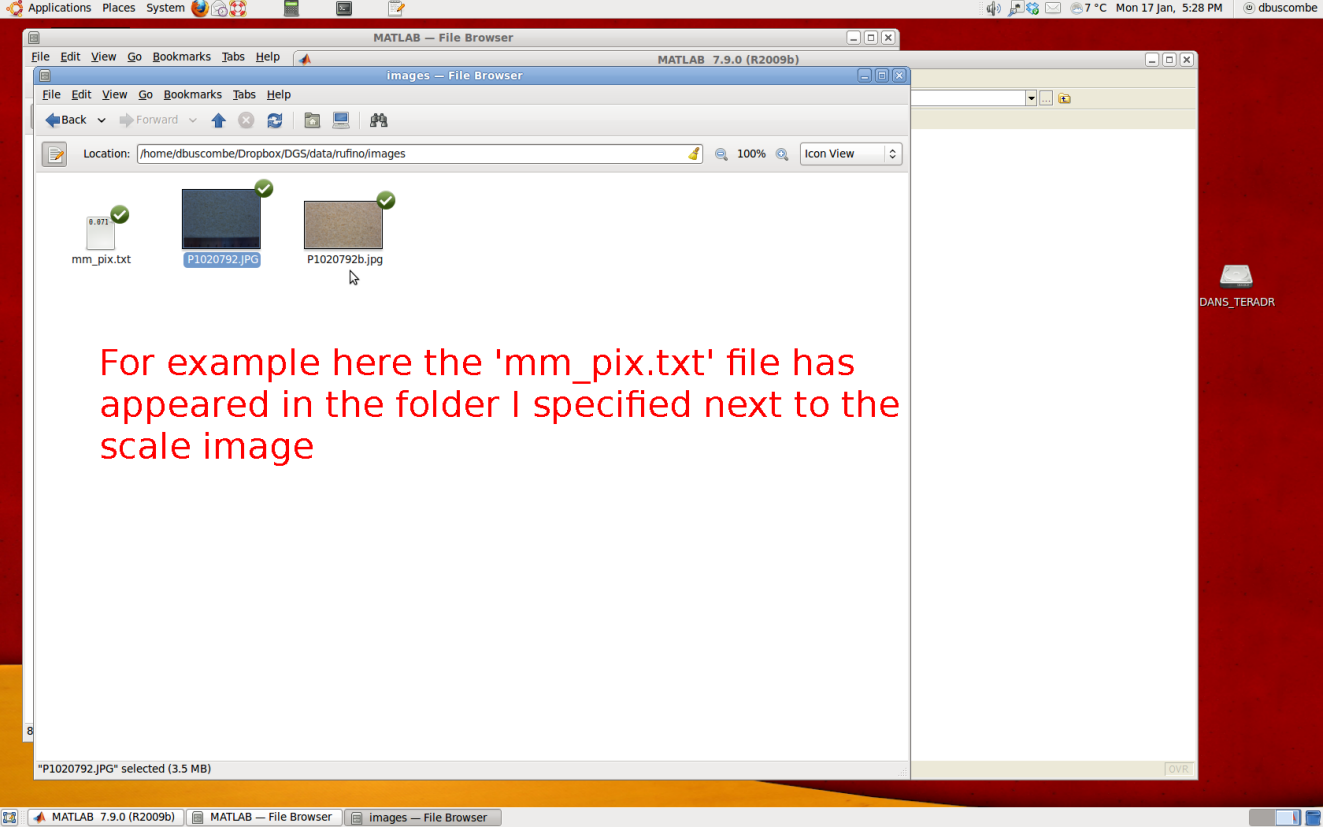

Applications Places System
7 °C Mon 17 Jan, 5:27 PM dbuscombe
MATLAB —
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
File Edit Debug Deskto
Shortcuts How to Add
>> cd utilities
>> measure_mm2pix
Displaying image: P1
Zoom in to measuring
Start Busy
Figure 1
File Edit View Insert Tools Desktop Window Help
1520
1540
1560
1580
1600
1620
1640
1660
1680
1100 1150 1200 1250 1300 1350 1400 1450
DANS_TERADR
For example, here I've zoomed into the ruler.
In this case I can measure a known distance in
the image quite easily by choosing any number
of millimetre increments. If, however, you have
a coin or similar object, you need to zoom in to
its full extend so you can measure across its
entire measurable length
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]
Figure 1

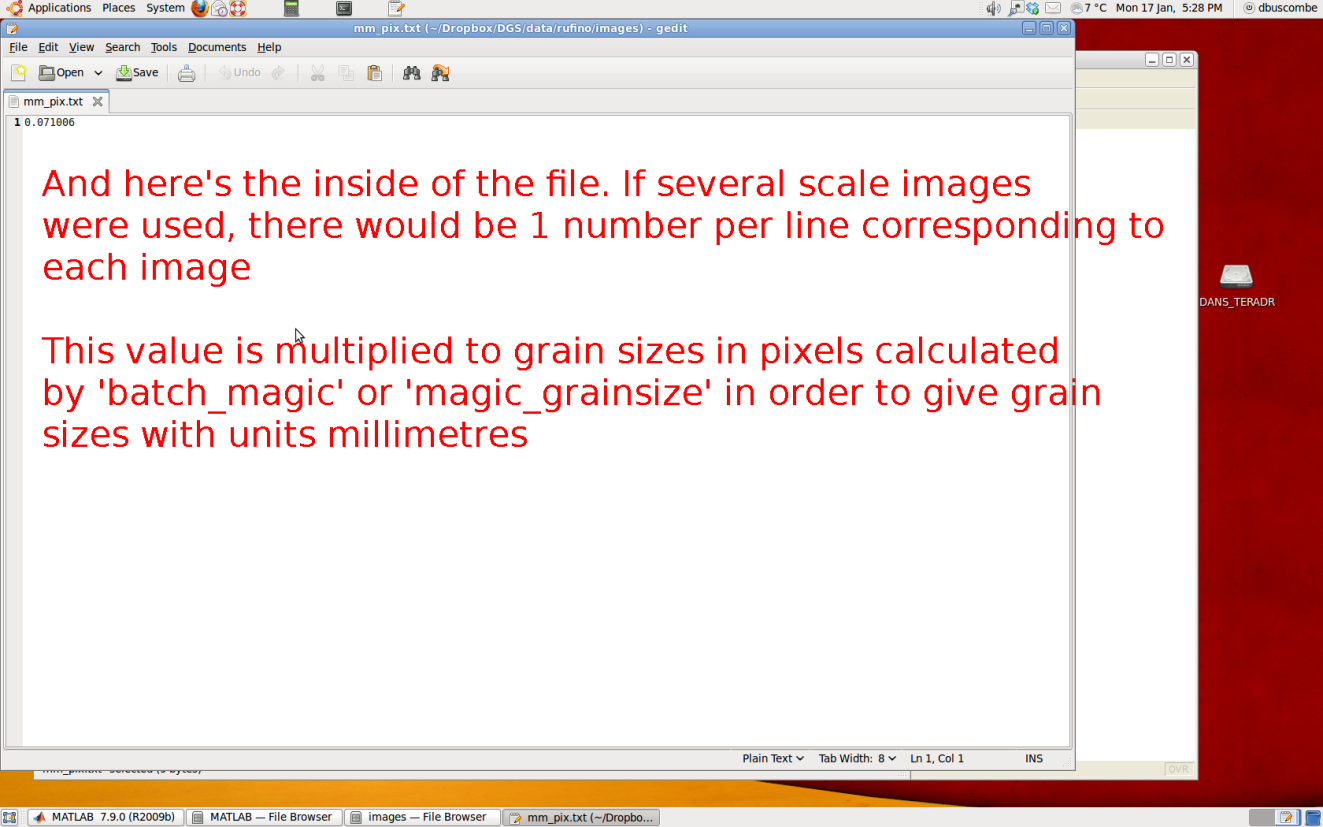


A dialogue box will ask you to input the distance in millimetres, that you will measure. This is your known length of object. Here, for example, I input 10 (mm) and so I must then measure exactly 10 increments of the ruler


Applications Places System
7 °C Mon 17 Jan, 6:20 PM dbuscombe
MATLAB —
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
File Edit Debug Deskto
Shortcuts How to Add
>> measure_mm2pix
Displaying image: P1
Zoom in to measuring
Click on two points,
Figure 1
File Edit View Insert Tools Desktop Window Help
1550
1600
1650
1700
1750
1800
1850
800
1200
Question
Are you happy with this selection?
Yes
No
Cancel
DANS_TERADR
Then click on two points the distance apart you have previously specified (in my case 10mm). When the second click is completed, a red line is drawn between the points. The program asks if you're satisfied with this selection. If 'No' you can redo it. If 'Yes', the program will move on to the next image (or end if just 1 image)
Start Busy
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[manual — File Browser]
[Screenshot108.png-5...
[MathWorks - MATLAB ...
Figure 1
Question


Applications Places System
7 °C Mon 17 Jan, 5:27 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Desktop/MAT
subfunctions
utilities
README.txt
8 items, Free space: 69.2 GB
MATLAB 7.9.0 (R2009b)
File Edit Debug Desktop Window Help
Current Folder: /home/dbuscombe/Desktop/MATLAB/utilities
Shortcuts How to Add What's New
>> cd utilities
>> measure_mm2pix
Displaying image: P1020792.JPG
Zoom in to measuring tape...
Click on two points, 10 mm apart, then hit ENTER on the keyboard
0.071006
File written to: /home/dbuscombe/Dropbox/DGS/data/rufino/images/mm_pix.txt
>>
When the program ends, the resolution (mm/pixel)
is written to the screen, and to the file the name
of which you specified at the start of the program
Start
OVR
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
[images — File Browser]


Applications Places System
7 °C Mon 17 Jan, 5:28 PM dbuscombe
MATLAB — File Browser
File Edit View Go Bookmarks Tabs Help
MATLAB 7.9.0 (R2009b)
images — File Browser
File Edit View Go Bookmarks Tabs Help
Back Forward
Location: /home/dbuscombe/Dropbox/DGS/data/rufino/images
100% Icon View
mm_pix.txt
P1020792.JPG
P1020792b.jpg
For example here the 'mm_pix.txt' file has appeared in the folder I specified next to the scale image
"P1020792.JPG" selected (3.5 MB)
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
images — File Browser


Applications Places System
7 °C Mon 17 Jan, 5:28 PM dbuscombe
mm_pix.txt (~/Dropbox/DGS/data/rufino/images) - gedit
File Edit View Search Tools Documents Help
Open Save Undo
mm_pix.txt
1 0.071006
And here's the inside of the file. If several scale images were used, there would be 1 number per line corresponding to each image
This value is multiplied to grain sizes in pixels calculated by 'batch_magic' or 'magic_grainsize' in order to give grain sizes with units millimetres
Plain Text Tab Width: 8 Ln 1, Col 1 INS
DANS_TERADR
MATLAB 7.9.0 (R2009b)
MATLAB — File Browser
images — File Browser
mm_pix.txt (~/Dropbo...

Feedback, Questions and Comments? Email Dan Buscombe:

daniel.buscombe@plymouth.ac.uk

Look out for version 3 featuring an automated statistical estimate of grain size standard deviation (sorting) - coming soon!