

The data is organized by material, indenter size, and batch date. In each batch folder, there is the NanoSuite file, the exported data in excel, and the analysis for each test in MATLAB. There are also some example functions for reading and plotting the analyzed data. More details of the methods and samples can be found in the publications.

### Publications

- Weaver et al. (2016) Acta Materialia.  
<http://dx.doi.org/10.1016/j.actamat.2016.06.053>
- Weaver and Kalidindi. (under review)  
Mechanical characterization of Ti-6Al-4V titanium alloy at multiple length scales using spherical indentation stress-strain measurements.

### Summary Files

- Summary of ISS Results all CP data\_updated.xls
- Summary of ISS Analyses Ti64\_updated.xls
- Suggested\_Tests\_for\_ISS\_trends\_updated.xls

### Batch Files (example)

- 2014-06-18 Batch #00001 (batch folder)
- Analysis RR9.mat (analysis)
- Ti64\_TL216um\_475nm\_2014\_06\_18.xls  
(exported raw data)
- Ti64\_TL2\_16um\_475nm\_2014\_06\_18.mss  
(NanoSuite raw data)

### MATLAB functions/scripts

- ReadandPlot.m
- Explore.m
- TagAvs.m

## Summary Files

The summary files contain the test file name and number, the grain orientations, and the results. There are four sheets in the summary files for CP-Ti (**Summary of ISS Results all CP data\_updated.xls**) and Ti-64 (**Summary of ISS Analyses Ti64\_updated.xls**). For CP-Ti, the sheets are labeled by the indenter size. The 16 and 100  $\mu\text{m}$  radius indenter results are on the same feature ( $\alpha$ -Ti grains). For Ti-64, the sheets are labeled based on the phases indented: "Ti64 a" are indents with the 16  $\mu\text{m}$  indenter on  $\alpha$ -Ti64 and "Ti64 ab" are indents with the 100  $\mu\text{m}$  indenter on  $\alpha$ - $\beta$  Ti-64. The last two tabs for summary files are the respective grain averaged properties. Some tests were excluded from the grain averaged properties based on the quality of the measurement. If the Tag column for the property has a zero in it, this data point was excluded. The last summary sheet (**Suggested\_Tests\_for\_ISS\_trends\_updated.xls**) contains some suggested tests to look at.

## MATLAB Functions/Scripts

The analysis was done in MATLAB, and the results and variables used in the analysis were saved in structured file. This can be loaded into MATLAB. A basic script (**ReadandPlot.m**) has been provided with reads a single analysis (.mat files) and plots the indentation stress-strain curve and zero-point corrected load-displacement curve. In reality there are multiple acceptable answers for a single test. A basic script to look at the multiple saved answers (**Explore.m**) has been provided. This makes a plot with points for each answer. A result can be plotted by clicking on a data point and clicking on "Plot ISS Analysis". The average and standard deviation of all these answers is the final answer for a single test. The grain average tables in the summary files were computed using **TagAvs.m**.