

# **SAGUARO**

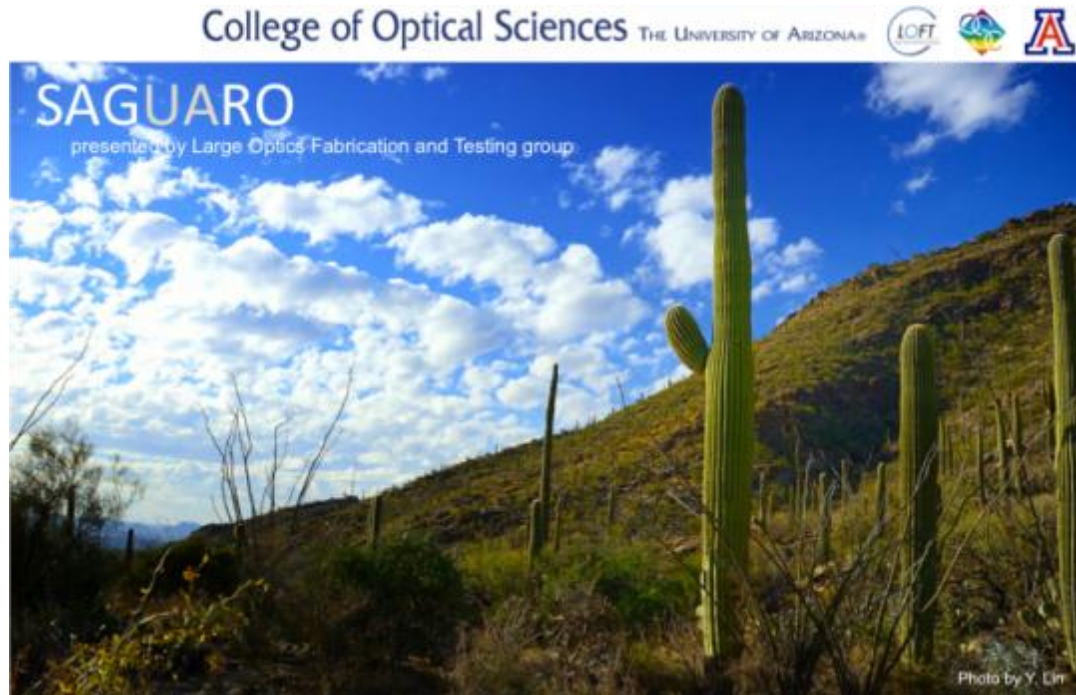
**OPEN-SOURCE DATA ANALYSIS AND VISUALIZATION SOFTWARE PLATFORM**

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# SAGUARO

## NOT JUST A TYPE OF CACTUS ANYMORE



**SAGUARO (Software Analysis Graphical-user-interface from University of Arizona for Research in Optics).**

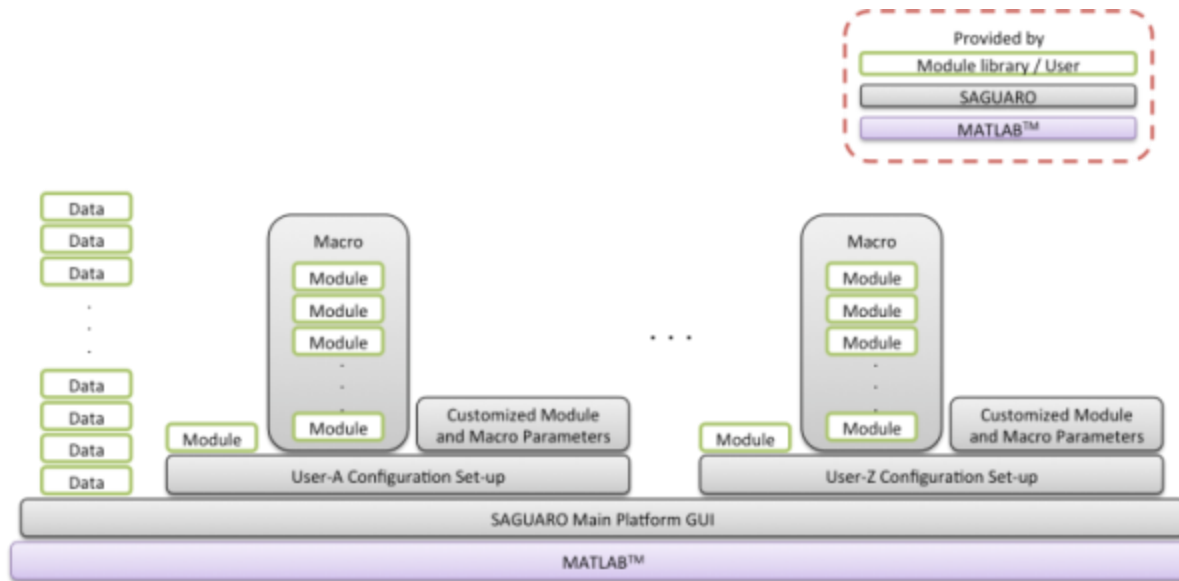
**Free Share-ware data processing platform for optical engineering.**

**More than 400 downloads since the beta-release at the SPIE conference in Sept. 2011.**

*Dae Wook Kim, Benjamin Lewis, and James Burge, "Open-source data analysis and visualization software platform: SAGUARO," Optical Manufacturing and Testing IX, Proc. of SPIE Vol. 8126, 81260B (2011).*

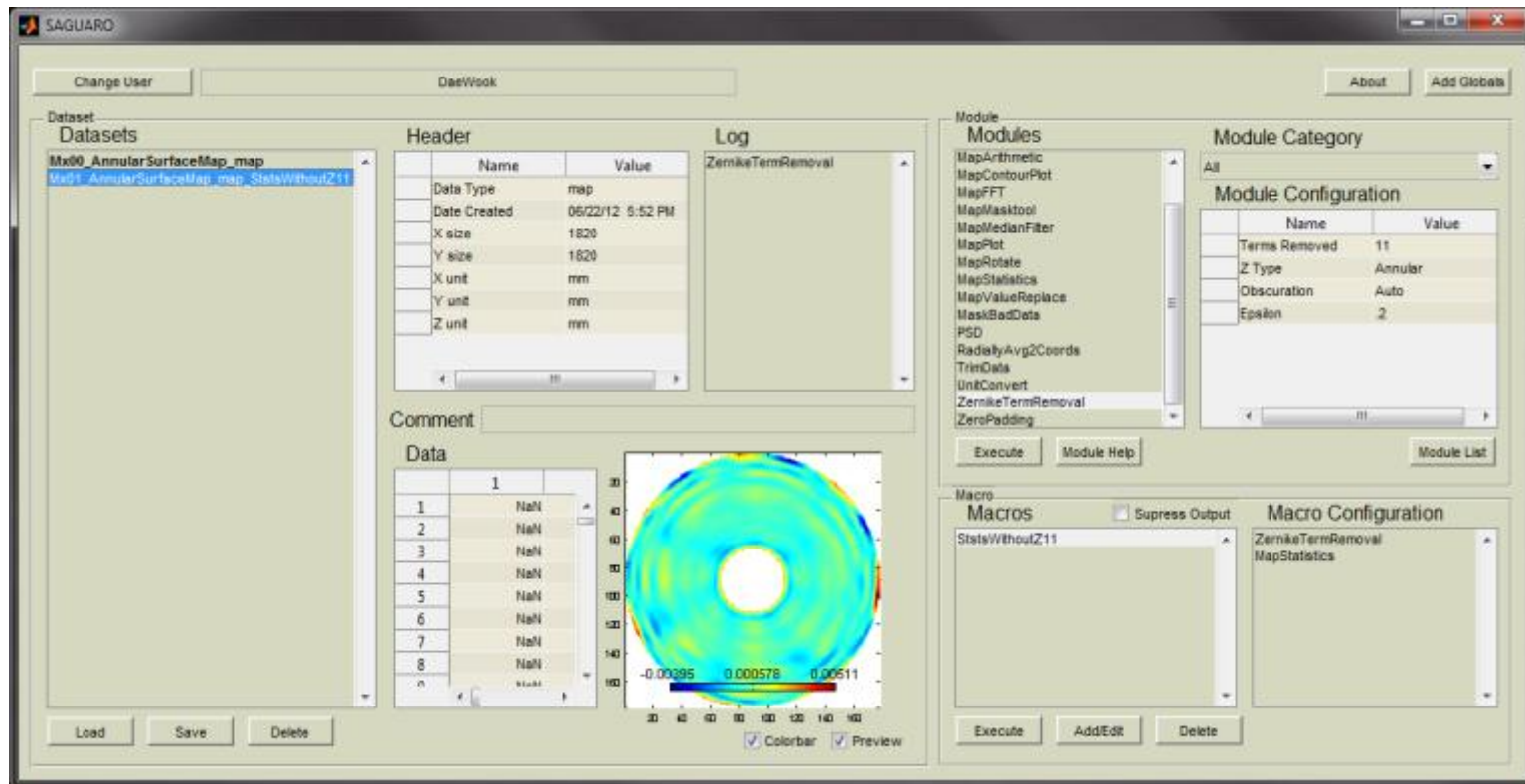
# SAGUARO

## MATLAB™-BASED DATA PROCESSING PLATFORM



- Matlab™-based data processing platform
- Provide a standard way to manipulate and visualize various types of data
- Operation via the GUI (graphical user interface)
- Data processing by running modules that use proscribed standard formats
- Macro feature allowing pipe-lined modules for complex operations

# MAIN PLATFORM GUI OF SAGUARO



User directory setting (top area), 'Dataset' panel (left side),  
'Module' (top-right) and 'Macro' (bottom-right) panels in the main GUI.

# STANDARD DATA TYPES IN SAGUARO

Standard data types for SAGUARO are defined.

Every SAGUARO module assumes the standard data format.

Key to compatibility between modules developed by independent developers.

# STANDARD DATA TYPES

## IN SAGUARO

Data Type	File extension	Data format	Header (with e.g. parameter values)	Etc.
Map	.map	a X b 2D matrix	\$Date Created=08/20/11 1:14 PM \$X size=1820 \$Y size=1820 \$X unit=mm \$Y unit=mm \$Z unit=mm	'NaN' for background values
Mask	.mask	a X b 2D matrix	\$Date Created=08/20/11 4:24 PM	'NaN' for masking area, and 1 for un-masked area
Frequency Map	.freqmap	a X b 2D matrix	\$Date Created=08/20/11 3:03 PM \$X Max Frequency=0.048626 \$Y Max Frequency=0.048626 \$X unit=1/mm \$Y unit=1/mm \$Z unit=mm	'NaN' for background values
Zernike Coefficients	.zernike	a X 3 2D matrix	\$Date Created=06/13/12 1:25 PM \$Radius=10 \$Radius unit=mm \$Height unit=nm \$Obscuration Ratio=0.1	1st column: Zernike Coef., 2nd column: m, 3rd column: n (where $Z_m^n$ )
Layermap	.layermap	a X b X c 3D matrix	\$Date Created=06/13/12 11:59 AM \$X size=10 \$Y size=10 \$X unit=mm \$Y unit=mm \$Layer unit=nm, $\mu\text{m}$ \$Layer Label=peaks, Airy function	a X b part is defined same as 'Map' data type. This data type can store multiple (i.e. c) maps. There is an empty line between a X b maps.
Coordinates	.coordinates	a X b 2D matrix	\$Date Created=06/13/12 12:16 PM \$Column unit=mm, mm, nm \$Column Label=x position, y position, Sinc function	Each column may represent any list of data. (e.g. 1st column: x, 2nd column: y, 3rd column: z)
General	.general	undefined	undefined	Arbitrary user-defined data type

Note: Templates for each data type can be found in the "Templates" folder in SAGUARO.

# **MODULES IN SAGUARO**

**Greatest power of SAGUARO is provided by its flexibility using the plug-and-execute module features.**

**Main SAGUARO platform only provides a convenient environment for the modules, and controls the data traffic between them.**

**Actual data analysis or visualization is performed by modules.**

**A module can contain almost any user-defined MATLAB™ functions, which follows a proscribed format to communicate with the SAGUARO main platform.**

**Numerous modules already have been written and included in the module library (more than 25 modules in SAGUARO 1.4).**



Open-source Data Analysis and  
Visualization Software Platform

**DEMO**  
**USING SAGUARO 1.4**



# CURRENT RELEASE V. 1.4

[HTTP://WWW.LOFT.OPTICS.ARIZONA.EDU/SAGUARO/](http://www.loft.optics.arizona.edu/saguaro/)

**LOFT, Large Optics Fabrication and Testing group & OEFF**

Developing advanced technologies for optical testing and fabrication of large optical components and systems.



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## SAGUARO



### Open-source Data Analysis and Visualization Software Platform

Optical engineering projects oft massive data processing with many steps in the course of design, simulation, fabrication, metrology, and evaluation. A MATLAB-based data processing platform has been developed to provide a standard way to manipulate and visualize various types of data that are created from optical measurement equipment. The operation of this software platform via a graphical user interface is easy and powerful. Data processing is performed by running modules that use a proscribed format for sharing data. Complex operations are performed by stringing modules together using macros. While numerous modules have been developed to allow data processing without the need to write software, the greatest power of the platform is provided by its flexibility. A developer's toolkit is provided to allow development and customization of modules, and the program allows a real-time interface with the standard MATLAB environment. This software, developed by the Large Optics Fabrication and Testing group at the University of Arizona, is now publicly available.

*D. W. Kim, B. J. Lewis, and J. H. Burge, "Open-source data analysis and visualization software platform: SAGUARO," Proc. SPIE, (2011)*

**THANK YOU.**