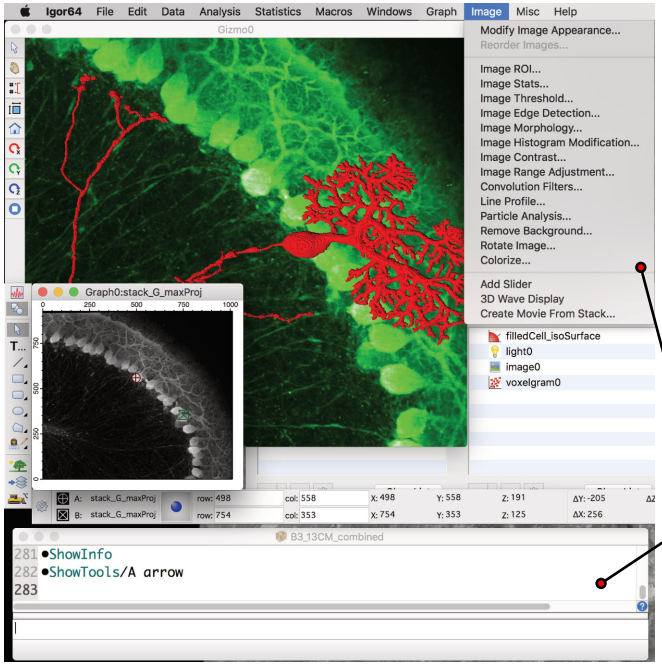
Igor Pro

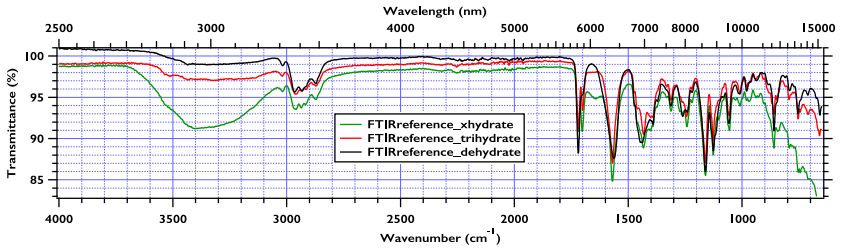
Technical Computing for Scientists and Engineers

WaveMetrics, Inc.

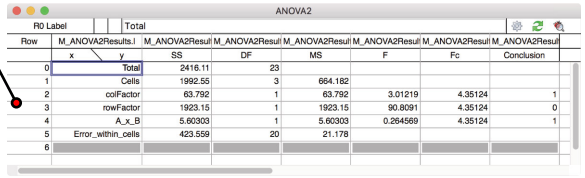


Unique user interface combines a point-and-click GUI with command-line operations

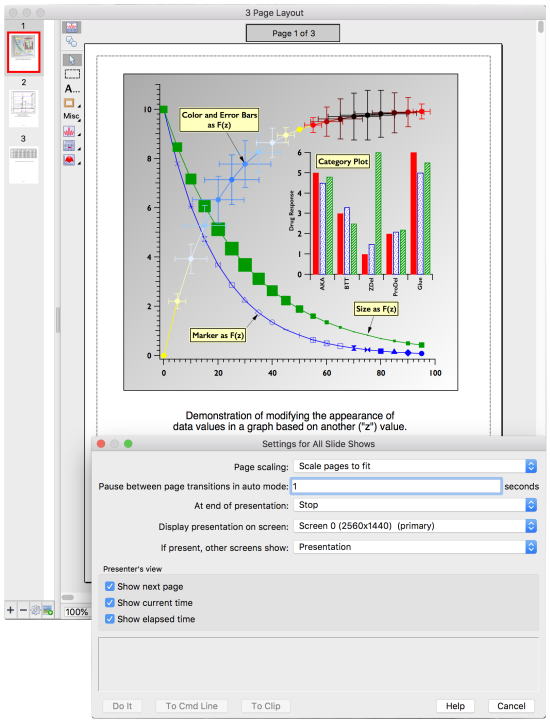
An Igor Pro graph is a powerful tool for data exploration, analysis and presentation: graphs quickly display thousands, even millions of values

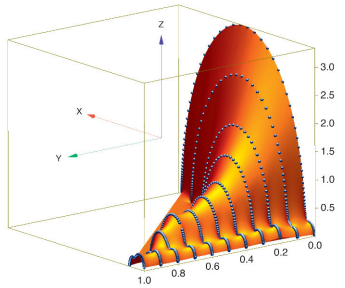


Enter data directly into a table, import many data file formats, or acquire data from instruments

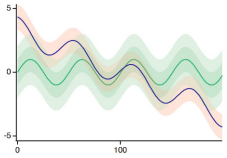


With only Igor Pro, you can create and present a multi-page slide show containing graphs, Gizmo plots, tables, annotations, drawn objects, and imported graphics

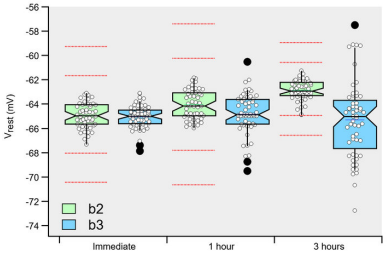




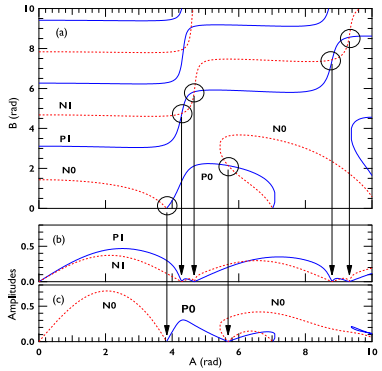
An Igor Pro "Gizmo" displays 3D data using OpenGL



Use transparency in graphs to indicate overlapping data

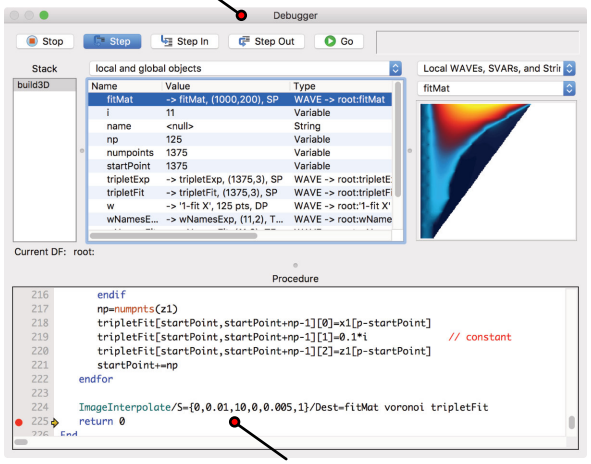


New plot types include Box Plots, Violin Plots, and "Rug" Plots



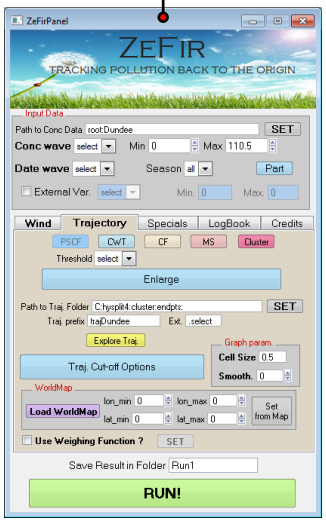
Igor Pro graphs are publication-quality, with EPS, PDF, and PNG export options

The Symbolic Debugger makes it easy to step through code to track down bugs



Sophisticated programming environment — write your own code or build on the work of others

Define your own buttons, readouts and inputs to produce custom control panels



Igor Pro

Technical Computing for Scientists and Engineers

Runs on macOS 10.10 and later, and on Windows 7 and later

Fast Display of Large Data Sets

Interactive Data Exploration

Journal–Quality Graphics

High DPI Display Support

Fully Unicode Text

Powerful Curve Fitting

Extensive Data Analysis & Statistics

Image Processing

Data Acquisition Support

Built-In Programming Environment to Automate Importing, Analyzing, and Displaying Data

Customizable User Interface

Used by Scientists and Engineers Worldwide Since 1989

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Graphing

- Graph types include highly customizable X-Y plots, contour, image, category, waterfall, box, and violin plots. Create interactive 3D visualization graphics with "Gizmo".
- Choose from 62 built-in marker symbols, text markers (either a character or from other data), arrow markers, error bars, 17 customizable dashed line types.
- Specify marker color, marker size, or marker type as functions of other data. 72 fill patterns, positive and negative fills, fill between curves, with transparency support.
- Interactively zoom and pan. Use cursors to inspect data values.
- Text annotations, legends, and color scale bars. Use subscripts, superscripts, mixed fonts and styles, with full Unicode support for mathematical symbols and multiple languages.
- High resolution drawing tools in data or relative coordinates.
- Fully customizable and unlimited numbers of axes. Date and time axes in a wide variety of formats.

Image Plots

- Image plots from matrix and XYZ data.
- Display images using 60 built-in color tables. Create indexed or custom color tables. Limit colors to a range of data.
- Fully customizable color scale bars.

Contour Plots

- Automatic and user-defined, arbitrary contour levels.
- Color or fill contours according to level, indexed from data, or all the same.
- Control contour label style, appearance, and position.

3D Visualization

- Create surface, 3D path, and ribbon plots, 3D scatter and object plots, iso-surface voxelgrams and volume slices with transparencies and textures.

Curve Fitting

- Fit data using built-in and arbitrarily complex user-defined functions with unlimited independent variables and fit parameters; fit to arbitrary subsets; hold coefficients, using multiple threads.
- Apply weighting and linear constraints.
- Levenberg-Marquardt method for nonlinear fitting.
- Orthogonal Distance Regression with built-in parallelization, errors in X, Global Analysis.
- Built-in fits: linear, polynomial (1D & 2D), exponential, double exponential, power law, sine, gaussian (1D & 2D), lorentzian, lognormal, Hill equation, sigmoid.
- Outputs include parameter values, standard deviation and confidence intervals; model curves; residuals; confidence bands; covariance matrix; chi-square.

Presentation

Layouts

- Use page layouts to precisely arrange graphs, tables, pictures, annotations, and drawing elements for printing or export.
- Present a series of layout pages with the Slide Show.

Notebooks

- Igor Pro notebooks provide a built-in, programmable word-processor; use them to record experiment results using text, tables and graphs.

Export

- Print and export high-resolution graphics in EPS, PDF, enhanced metafile, TIFF, PICT, BMP, SVG, and PNG formats.

Analysis & Statistics

- Faster computations through parallel threading of many operations.
- Single and multidimensional mixed-radix FFTs, continuous and discrete wavelet transforms, Hilbert, Hough, Wigner and Fast Gauss Transforms.
- Smoothing (binomial, Savitzky-Golay, box, median, Loess), integration, differentiation, IIR and FIR filtering, convolution, ordinary differential equations, histograms, sorting, area, mean, array arithmetic, windowing, peak and level detection.
- Full suite of matrix operations using standard LAPACK routines.
- Find function roots or extrema using direct methods or simulated annealing.
- Special functions and orthogonal polynomials.
- Probability distribution functions, cumulative and inverse cumulative distribution functions.
- Statistical analysis including moments, quantiles, correlations and serial randomness.
- Statistical tests including ANOVA, Bartlet, Cochran, Chi-squared, F, Jarque-Bera, Kolmogorov-Smirnov, Levin, Scheffe, t, and Tukey.
- Statistical multi-comparison tests.
- Non-parametric hypothesis tests including Friedman, Mann-Kendal, Kruskal-Wallis, Spearman and Wilcoxon's.
- Statistical analysis for angular data.
- Random number generators for various distributions.
- Cluster analysis with K-means and farthest-point algorithms.
- Computational geometry including 2D and 3D triangulation and interpolation.

Communication

- Support for bi-directional communication with web servers, including new support of encrypted connections using HTTPS.
- Serial communications via NIGPIB, VDT, and VISA.

Image Analysis

- Full suite of tools for image filtering, manipulation, and quantification.
- Image thresholding: iterated, bimodal, adaptive, fuzzy entropy, and fuzzy means.
- Operations for image arithmetic, arbitrary non-contiguous region of interest (ROI) masking, background removal, color segmentation, windowing (Hanning, Hamming, Bartlett, Blackman, Kaiser), blending, histograms, equalization, stack focus, registration, rotation, statistics.
- Particle analysis: number, area, perimeter, circularity, rectangularity, location, raw moments.
- Image morphology: binary and grayscale erosion, dilation, close, open, watershed, tophat, seed fill.
- Edge detection using canny, Frei, Kirsch, Marr, Prewitt, Roberts, Shen, and Sobel methods.
- Image transformations include FFT Hartley, Hough, convolution filters (gauss, gradients, median, sharpen, thin, min rank, max rank) color space conversions (RGB, HSL, XYZ), derivatives, correlations, extract and manipulate image data.
- Image import and export TIFF, JPEG, PNG BMP, Sun Raster.
- Capture images from live video.

Data Formats/ Import/ Export

- Millions of data points; 1-4 dimensions.
- Two floating-point and six integer formats, strings, date and time data.
- Special support for waveform (equally-spaced) data.
- Handle files in general binary, delimited text, Excel, Fortran fixed-field, FITS, HDF5, JCAMP, MatLab, Nicolet, TDM, JPEG, PICT, TIFF, BMP, Sun Raster, DEM, SDTS (and other GIS) data formats, MP3, AIFF, and WAVE sound files.
- Access SQL databases through ODBC.
- Create and control MPEG movies.
- Data Browser — organize data into a meaningful hierarchy, graphical previews of data, view and edit wave and variable properties.
- Write your own procedures to import/export custom file formats, or move, copy, and delete files and folders.
- Extract data using regular expressions ("grep").

Data Acquisition

- Acquire data from instruments through a USB port or through National Instruments GPIB boards.
- Acquire data using VISA through GPIB, serial port, TCP/IP, and other VISA-capable hardware.
- Create custom instrument user interfaces and automate data collection, retrieval, and analysis.

Programmability

- A full-featured structured programming language to control virtually all aspects of Igor Pro with over 977 built-in functions and operations.
- Automate data analysis and acquisition tasks.
- Multi-processor and threading support for built-in and user-defined routines.
- Long object names (255 bytes).
- Symbolic debugger.
- Procedure Browser allows you to quickly find and filter symbols (functions, macros, etc).
- Create custom interfaces using control panels with buttons, popup menus, lists, sliders, inputs, outputs. Add your own menus, completely or selectively replace Igor's built-in menus.
- Scriptable via AppleEvents or ActiveX Automation.

Igor Filter Design Lab Included

- Design, apply, and evaluate Finite and Infinite Impulse Response (FIR and IIR) filters in Igor Pro.
- FIR Filters include Kaiser's Maximum Flatness design, McClellan-Parks-Rabiner equiripple method, window method design (Hanning, Kaiser, Parzen, Welch, etc.).
- IIR Filters include Bessel, Butterworth, Chebyshev and Notch-only.
- View magnitude, phase, group delay, impulse, and step responses.
- Apply designed filters to your data and view the results.

Additional Software

Igor XOP Toolkit

- Enhance Igor Pro's capabilities with external code modules by combining your own C or C++ code with the Igor XOP Toolkit's source files.
- Create portable XOP modules for yourself and others to add customized functions, data loaders, data acquisition systems, etc., with their own menus, dialogs, and windows.

Igor NIDAQ Tools MX

- Acquire data directly into Igor Pro using National Instruments "multifunction" data acquisition boards, on Windows 7 or later.
- Pre-programmed control panels provide point-and-click interface for acquisition.
- Customized applications can be created using Igor's built-in programming language, extended by NIDAQ Tools MX to include data acquisition and control functionality.
- Igor control panels can be used to make a nice user interface for DAQ systems.

For more information and pricing visit our web site at www.wavemetrics.com