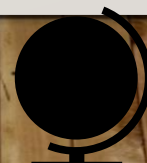




ORIGINPRO® 2023

The Ultimate Software for Graphing & Analysis

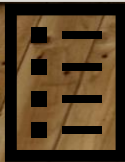
General introduction



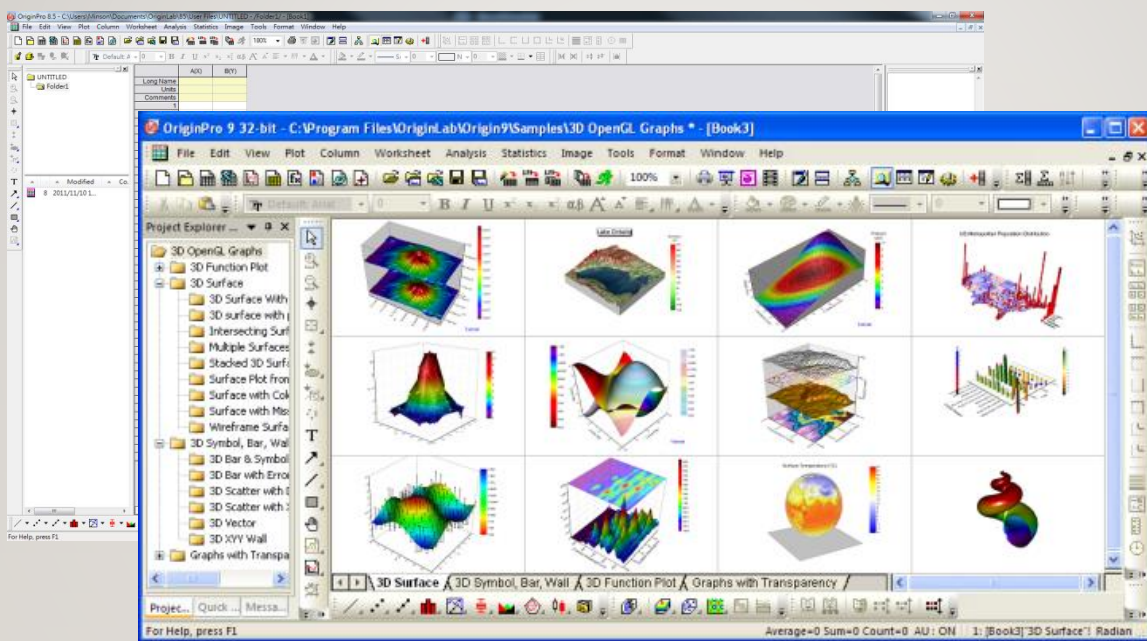
ORIGINLab原廠合格認證
張旭男 sherman chang

OUTLINE

- 簡介Origin/OriginPro
- Origin/OriginPro 繪圖功能
- Origin/OriginPro 資料分析功能
- Origin/OriginPro新功能*
- Origin/OriginPro應用案例
- 授權方式說明



ORIGIN/ORIGINPRO



資料數據導入/查詢/連結

可以直接導入**ASCII, CSV, Excel®**以及第三方格式的資料數據。可查詢資料庫，從**LabVIEW™**、**MATLAB®**、**Excel®**等發送程式和指令到**Origin**上進行後續任務

發表/展示/客製化報告

您可以透過多種方式快速地在**ORIGIN**創造出精美圖表與客製化報告；包含可以一指搞定圖表嵌入**Word®**和**PowerPoint**文件中。

*Origin2019b起新增data主選單

*Origin2020起新增mini toolbar

導入新數據後，**ORIGIN**能自動更新分析與圖表並產生報告



數據繪圖/瀏覽數據

輕鬆快速地產生高品質的圖表。可以保存能重複使用的繪圖模板與主題範本。您可以在圖表中直覺畫讀取數據資料，或是自由地旋轉、縮放或是滾動3D圖層查看局部區域。

消除/簡化資料與分析

使用帶有圖形化界面的**Gadget**工具在圖上直接產生互動式的分析結果；包含非線性擬合、積分等高階分析工具。



什麼是**ORIGIN**和**ORIGINPRO**

◆ **ORIGIN** 是個一個資料分析與繪圖套裝軟體。遍及全球的企業、政府機構、學術組織等領域，超過上百萬的科學家與工程師們每天在使用中。**Origin**提供了簡單易學的操作介面，整合各項使用者需求進而展現高度客製化的圖表與報告。

➤ 更高階的**OriginPro**，除了包含**origin**全部的功能之外，**OriginPro**提供了進階的分析工具，包含高階波峰擬合分析，高階統計與多種訊號處理的卓越能力。

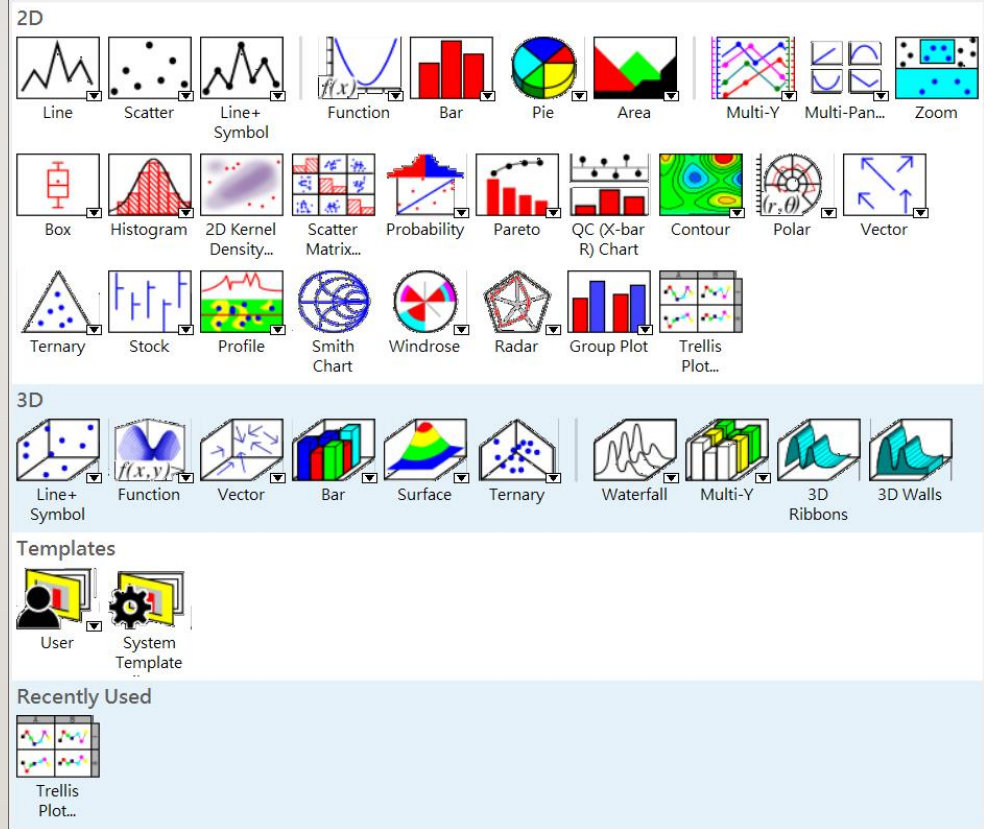
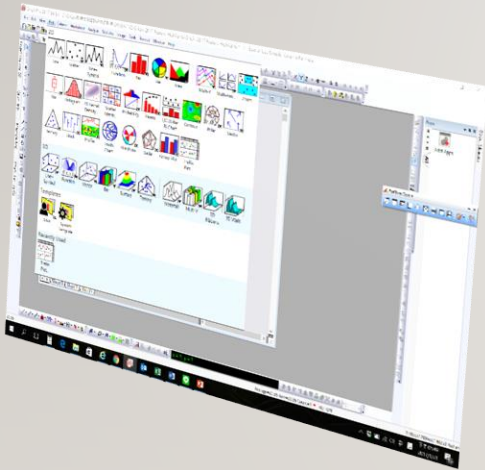
為何選擇ORIGIN

- 一指搞定繪圖/**All in One Tool**
- 完整的資料數據繪圖/**Graphing**
- 卓越之曲線擬合以及波峰分析能力/**Curve Fitting & Peak Analysis**
- 批次處理無須撰寫程式/**Batch Processing without Programming**

為何選擇

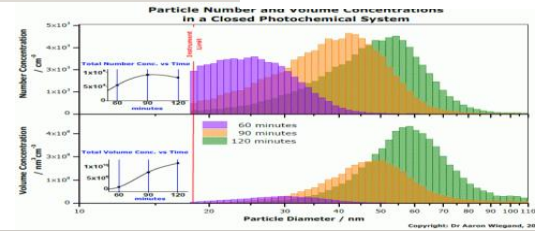
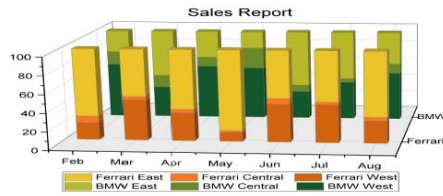
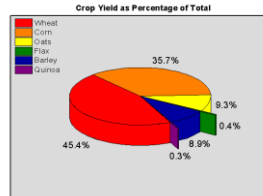
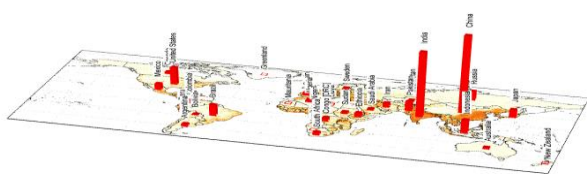
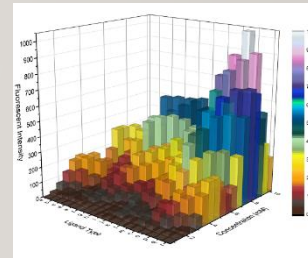
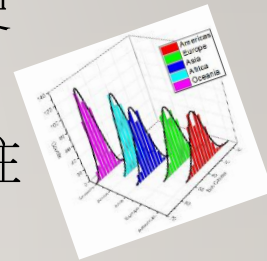
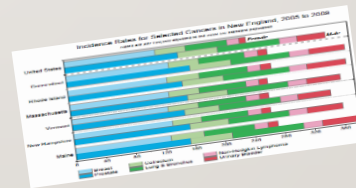
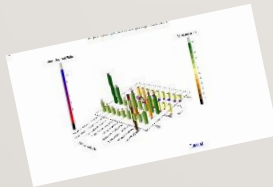
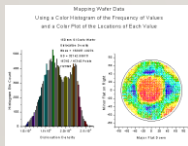
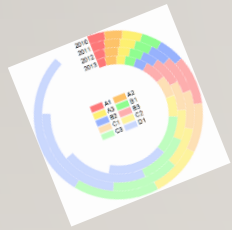
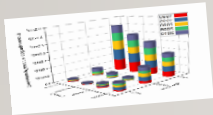
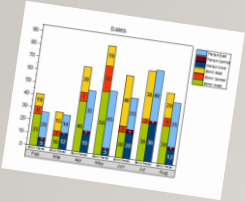
- ✓ 超越一般水準的技術支援與服務：**OriginLab**的專門客戶服務團隊有超越十位以上 / 技術支援單 / 原廠跨區域無時差服務。
- ✓ 追求完美且健全的軟體功能：語言型態支援英語，德語和日語。
OriginLab的軟體研發工程師超過**30**位以上(美國**&**中國)，並來自於統計/資工等各領域。每一年我們都會更新軟體版本，並以客戶提供的需求與回饋給我們的想法為基礎做改良。
- ✓ 持續追求卓越與成長的公司：願景是提供具備靈活彈性且簡單好用之資料分析和繪圖軟體，同時也符合需要各種廣度與深度範圍的使用需求。如**APP**的開發模式

ORIGIN/ORIGINPRO 的繪圖功能



柱狀圖/直方圖、長條圖(BAR CHART)和圓餅圖

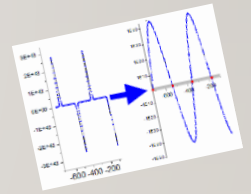
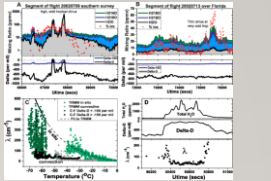
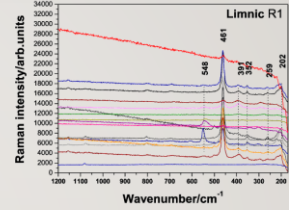
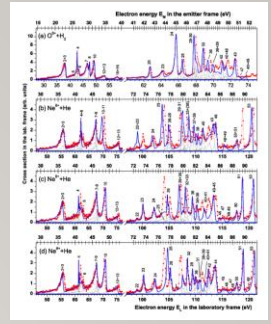
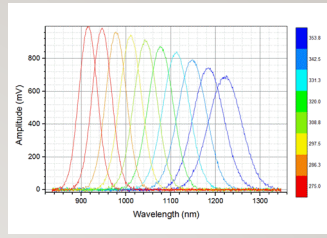
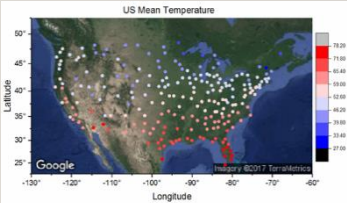
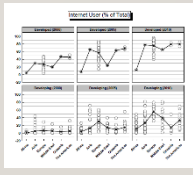
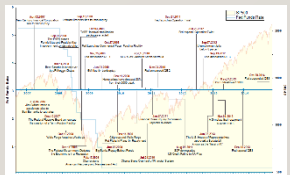
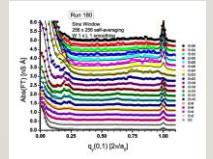
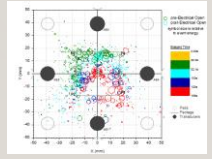
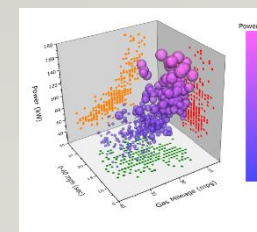
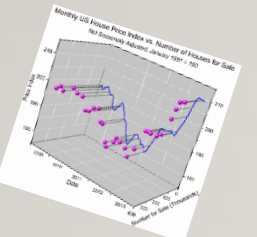
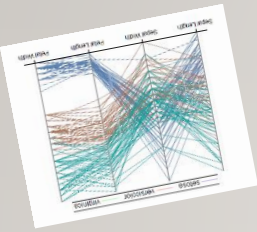
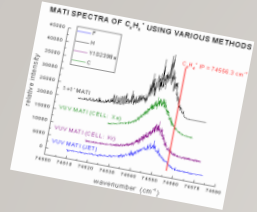
- 柱狀圖/直方圖、長條圖(Bar Chart)和圓餅圖是廣泛地使用在各領域的基本繪圖種類，Origin可以支援包含基本型、堆疊(Stacked)和群組(Grouped)以及浮動(Floating)柱狀圖/直方圖、長條圖之外，也支援3D柱狀圖以及2D圓餅圖。



折線圖和符號圖 (LINE & SYMBOL GRAPH)

Origin支援包括:

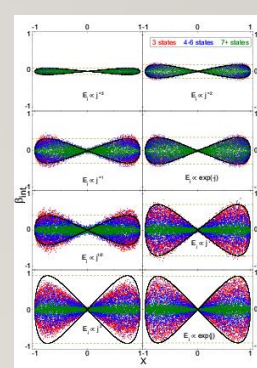
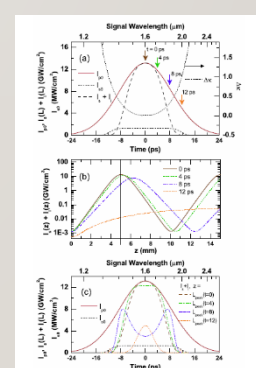
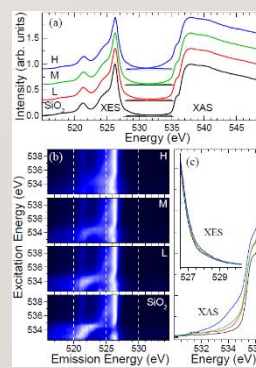
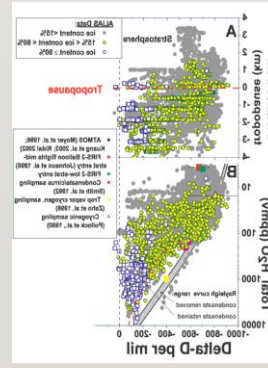
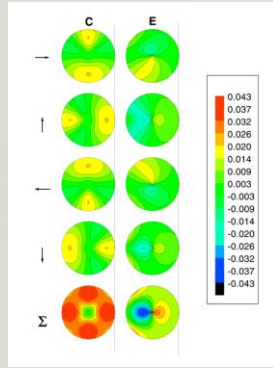
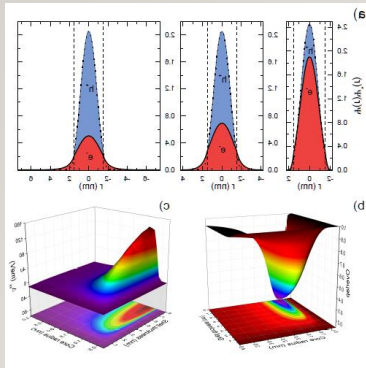
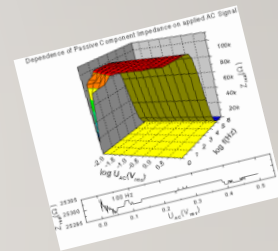
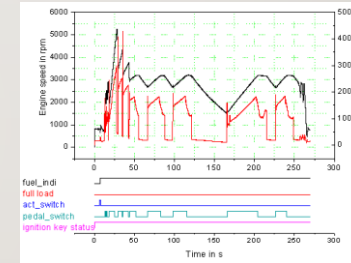
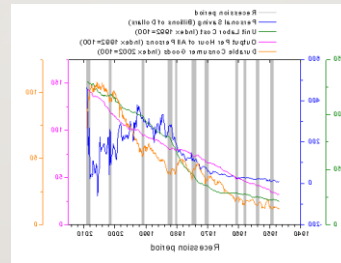
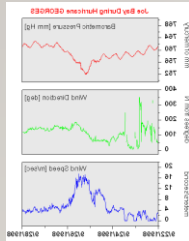
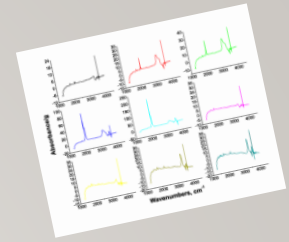
- 折線圖
- 散佈圖(Scatter plot):可以包含XY Error Bar，行散佈，水滴線(Drop line)，Color Map, Size Map。
- 折線圖和符號圖結合
- 區域圖(Area plot):單一區域，堆疊區域(Stacked Area)和填充區域(Fill Area)



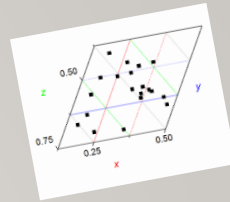
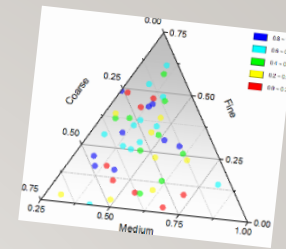
多軸(MULTI-AXIS)和多面板(MULTI-PANEL)圖型

為了展現多重的數據資料在同一個圖型製作畫面，origin 提供底下兩種重要功能

- 多軸圖型
- 多面板圖型

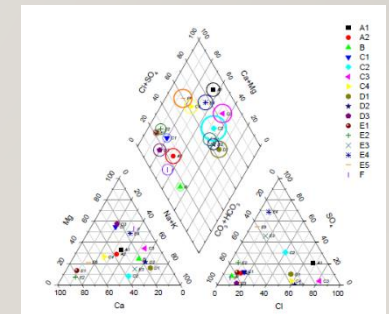
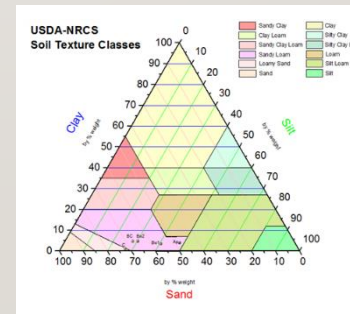
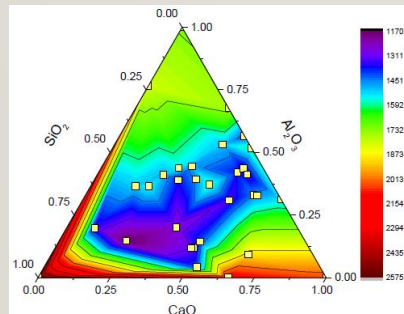
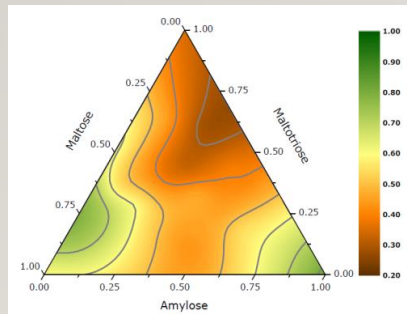
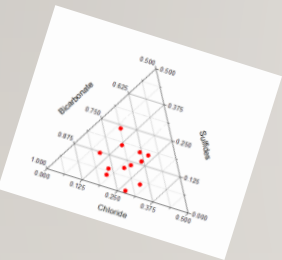
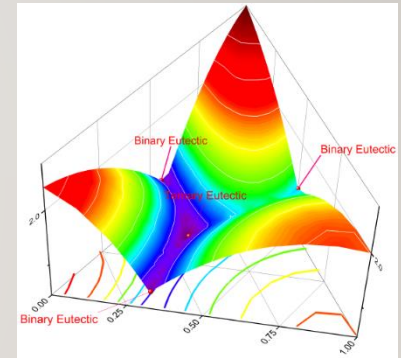


三元圖(TERNARY GRAPHS)和 PIPER GRAPHS

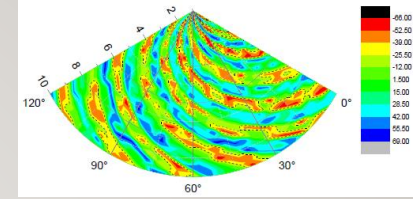
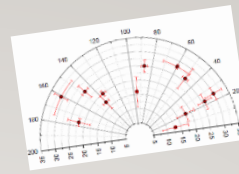
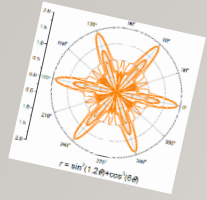


三元圖和Piper圖常常應用於特殊的地理科學和大眾工程領域上，如水化學分析等等。Origin支援包括:

- 2D三元圖(包含散佈圖或是輪廓圖)
- 3D三元圖(包含散佈圖或是colormap surface)
- Piper chart(水質化學分析圖)

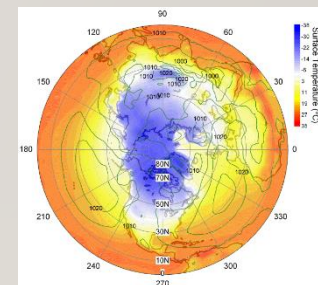
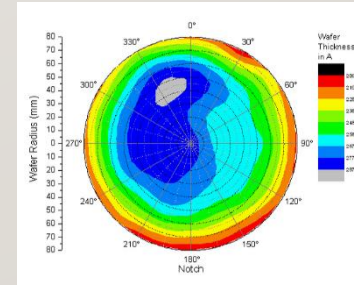
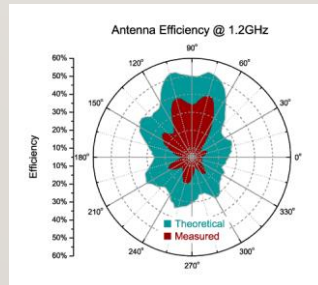
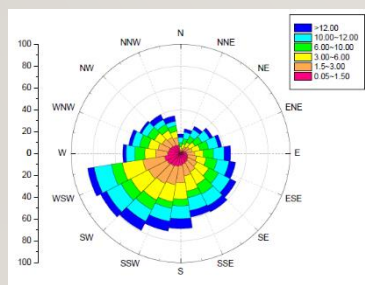
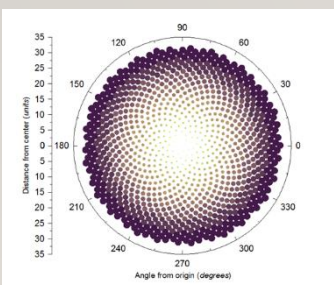
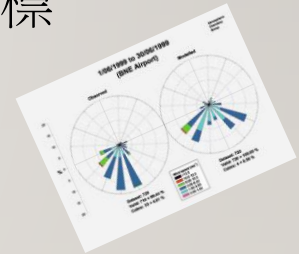
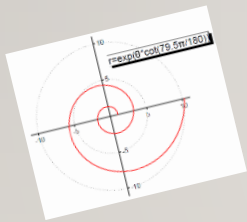
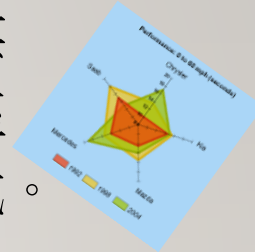


極座標圖(POLAR GRAPHS)

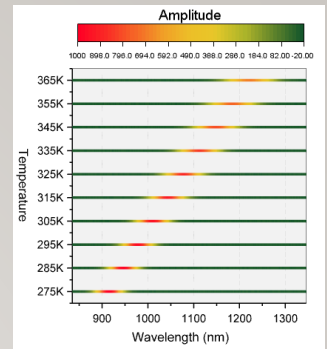


極座標可以藉由根據一個特定點的方向和距離來展現出某現象的特徵值，比如地球兩極地區下的溫度分佈圖。極座標同時也是面對處於多層次資料中能夠展現視覺化的方式。

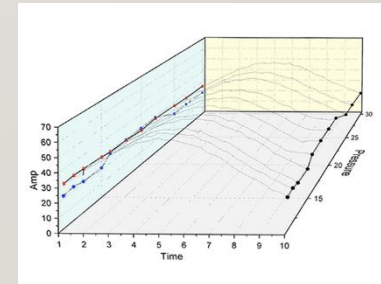
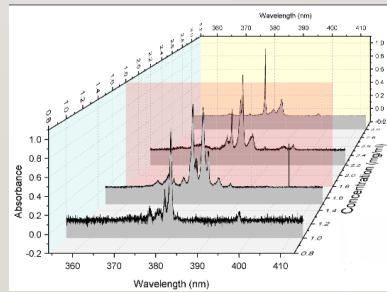
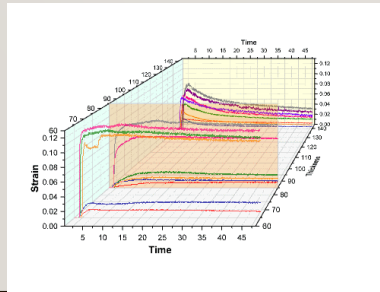
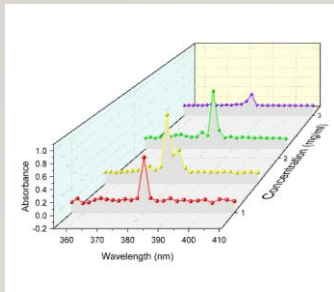
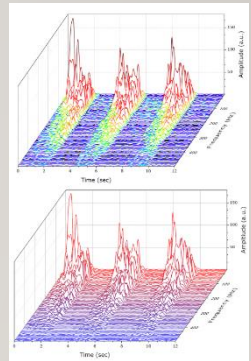
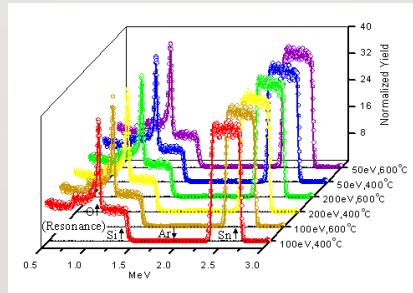
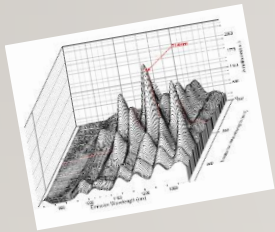
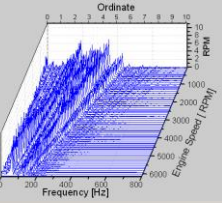
Origin提供簡單方便易用的模板可以展現資料和兩極座標函數，包括雷達圖和風花圖(Windrose diagrams)。



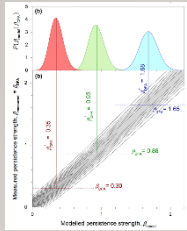
瀑布圖(WATERFALL GRAPHS)



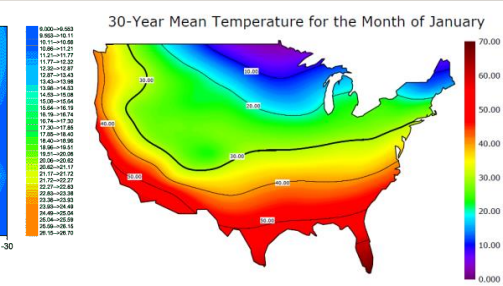
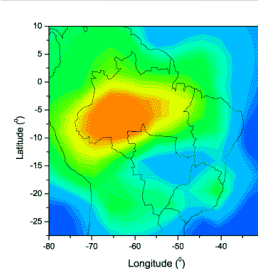
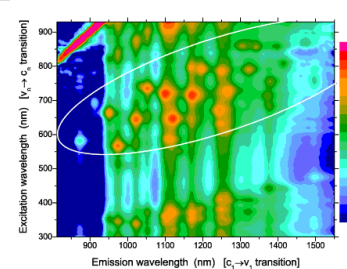
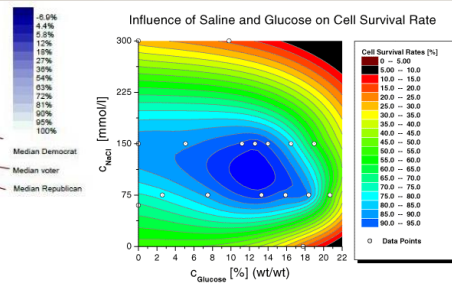
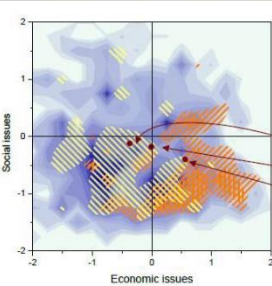
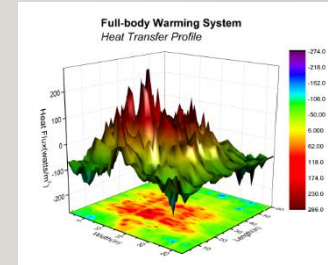
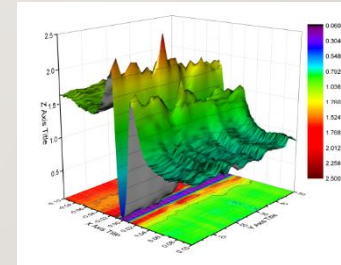
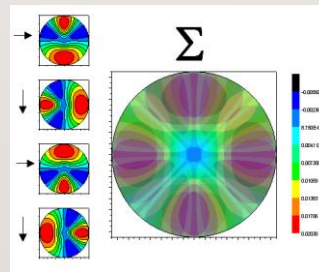
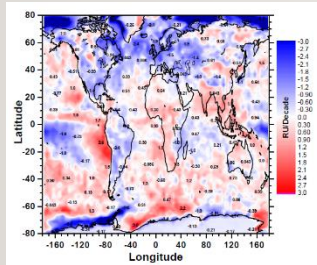
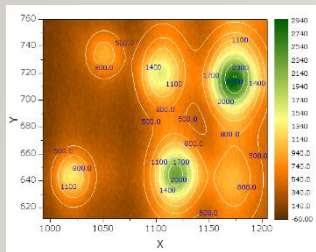
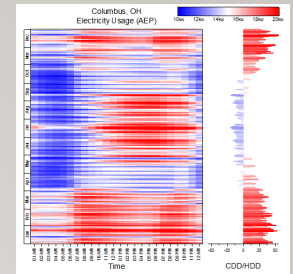
Origin的瀑布圖是最理想展現多重數據集在相同狀況下的變化比較圖。有三圍的變化效果，使您可以從Y或是Z的維度觀察變化趨勢。



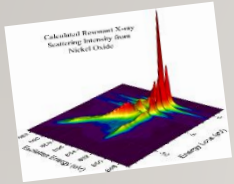
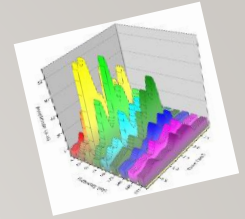
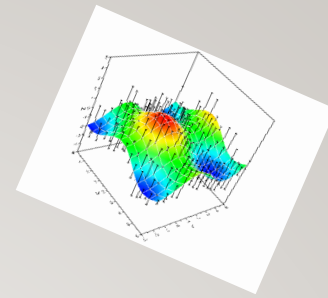
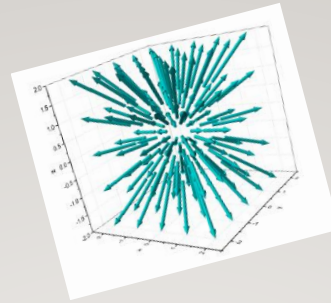
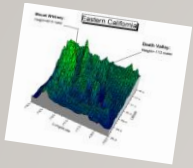
輪廓圖(CONTOUR)和熱區圖(HEAT MAP)



Origin的輪廓圖可以從XYZ資料表的數據資料或是從矩陣型態資料來創造出來，也能夠從輪廓線或是標籤來上色。包括註解的地方也可以同時上色，展現優異的視覺化效果。

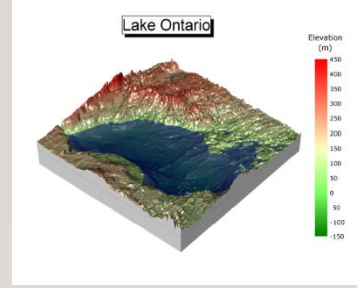
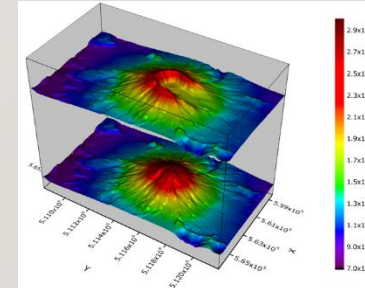
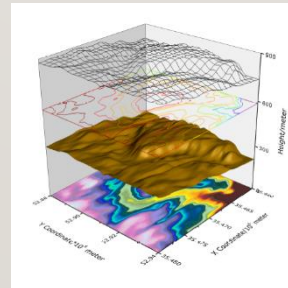
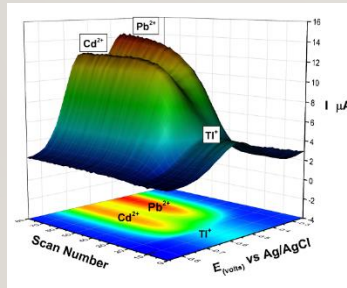
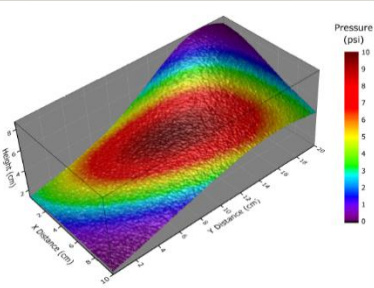
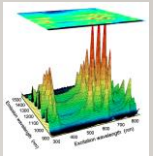
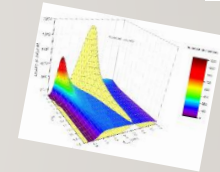
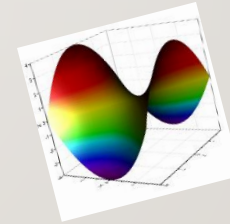
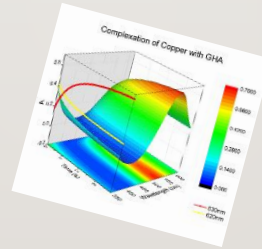
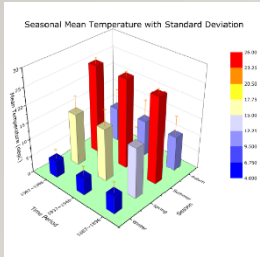


3D圖型

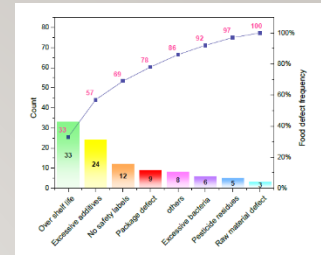
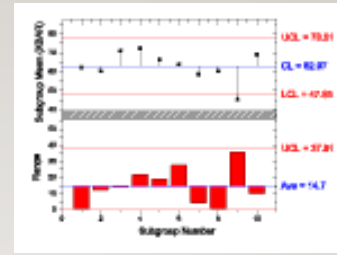
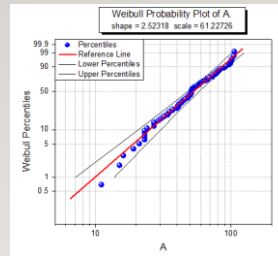


Origin支援3D圖型自由且即時的轉動，包括旋轉/延伸/扭旋。Origin提供：

- 3D符號/向量/軌跡圖(Trajectory plot)
- 3D長條圖
- 3D曲面圖

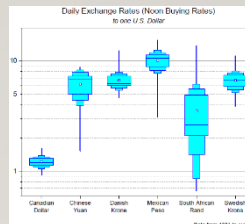
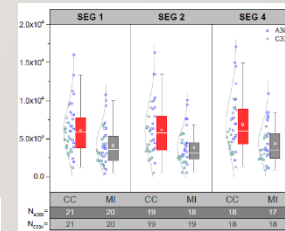
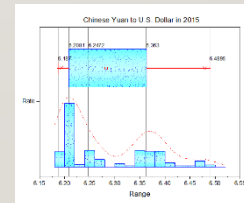
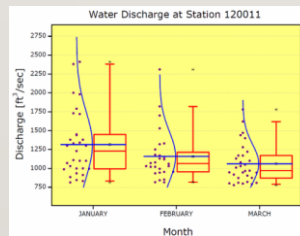
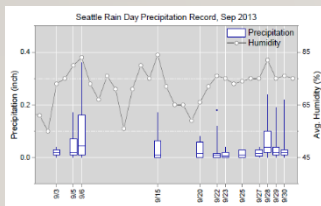
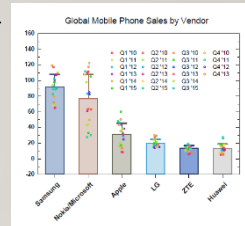
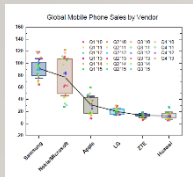


統計圖型



Origin支援許多種統計繪圖包括:

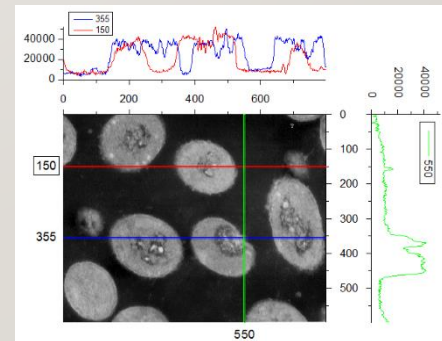
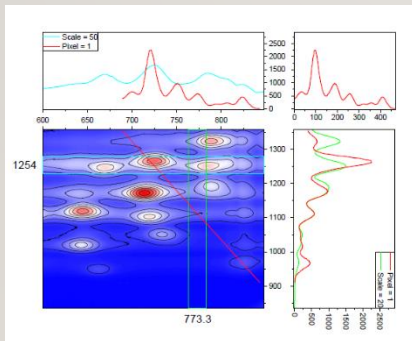
- 盒狀圖(Box Chart)，群組盒狀圖，直方圖，堆疊直方圖。
- 直方機率混合圖。散佈矩陣圖。機率分布以及常態分佈圖(Q-Q plots)。品管圖($\bar{x}$ bar R -Chart)。柏拉圖(Pareto Chart)。



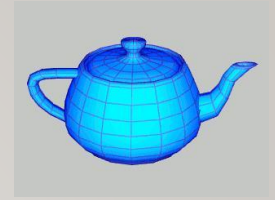
側面圖(PROFILE PLOTS)

Origin可以讓您創造輪廓圖以及影像圖的側面圖，可以清楚檢視您的資料的水平與垂直的交叉構面角度。

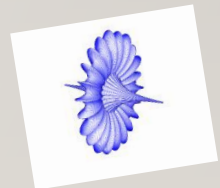
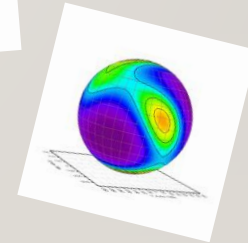
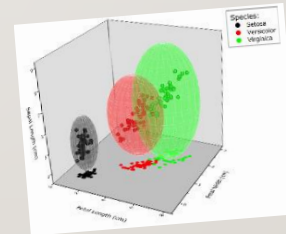
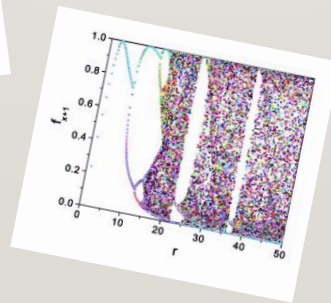
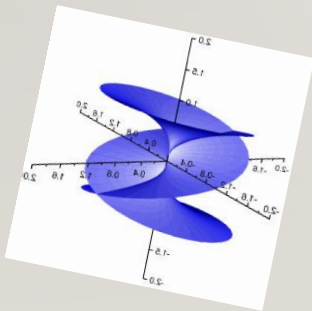
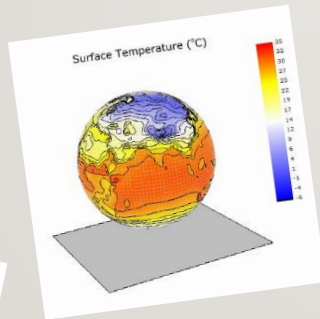
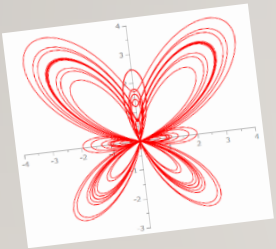
- 側面圖可以自由選擇水平，垂直或是特定線。
- 可同時展現多重側面圖
- 可以計算包括最大值、最小值、平均值、總和與變異數。



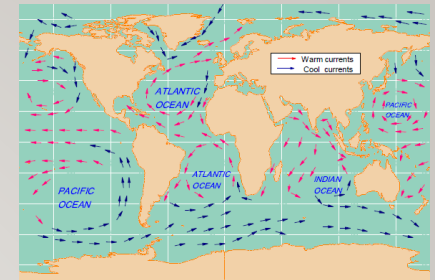
函數繪圖(FUNCTION PLOT)



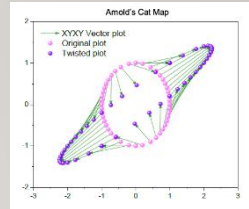
Origin支援2D和3D的參數繪圖方式，2D以及3D參數繪圖廣泛地被利用在描述圓形、拋物線圖和雙曲線圖。



其他專業領域圖表

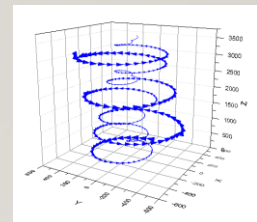
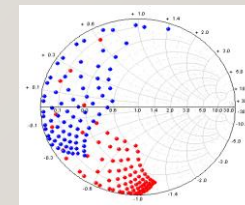
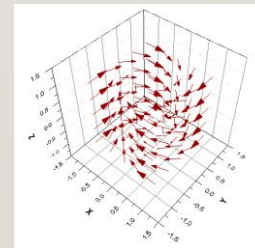
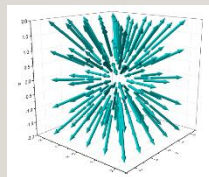
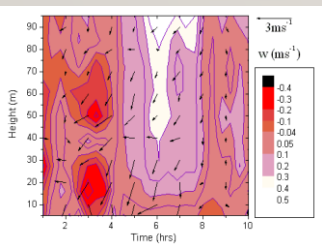
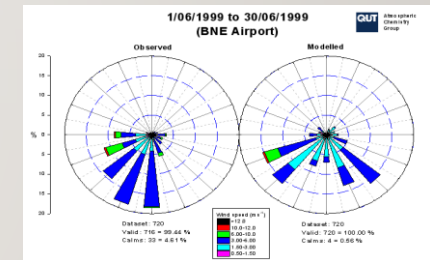
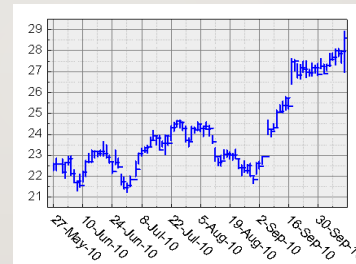
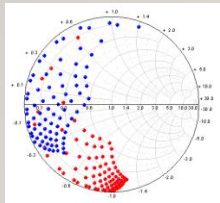


Origin 對各種專業領域提供了直接的支援，少數但專業的繪圖一樣可以直接從**Origin** 本身的圖表中直接選取無需做繁瑣的設定。



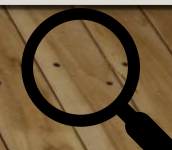
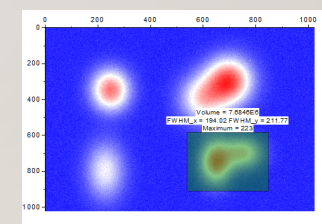
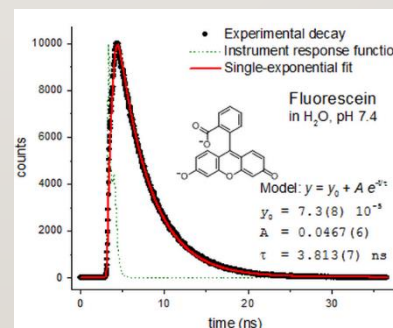
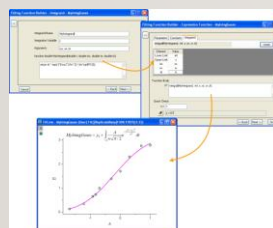
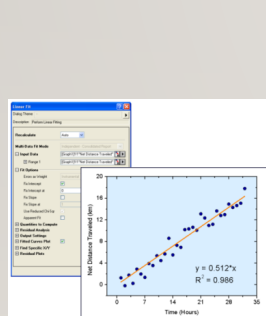
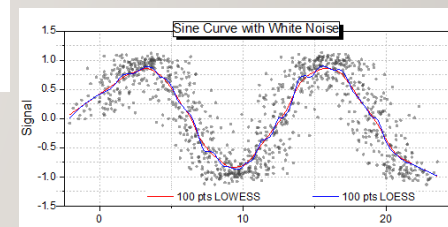
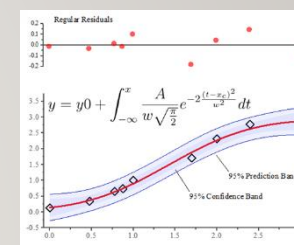
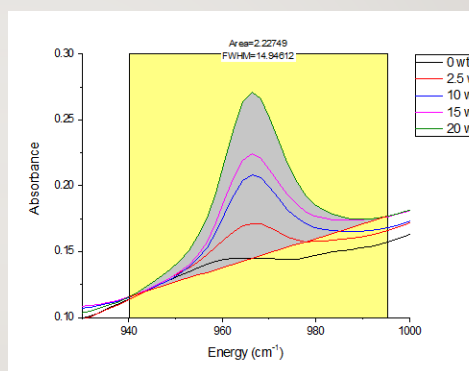
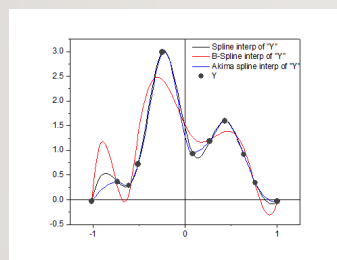
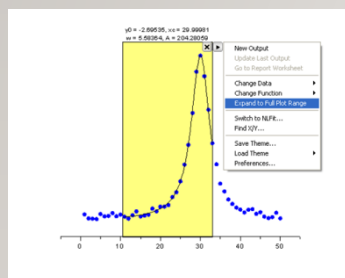
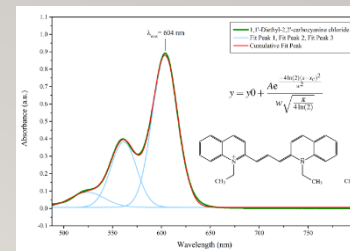
- **Origin** 支援

- 向量圖/風玫瑰圖
- 史密斯圖
- 股票走勢圖
- 其他專業圖表



- ✓ 柱狀圖/直方圖、長條圖(Bar Chart)和圓餅圖
 - ✓ 折線圖和符號圖(Line & Symbol Graph)
 - ✓ 多軸(Multi-Axis)和多面板(Multi-Panel)圖型
 - ✓ Ternary Chart (三元圖)
 - ✓ 極座標圖(Polar Graphs)
 - ✓ Waterfall Graphs (瀑布圖)
 - ✓ 輪廓圖(Contour)和熱區圖(Heat Map)
 - ✓ 3D圖型
 - ✓ 統計圖型
 - ✓ 側面圖(Profile Plots)
 - ✓ 函數繪圖(Function Plot)
 - ✓ 其他專業領域圖表

ORIGIN/ORIGINPRO 的資料分析功能



ORIGIN的資料分析功能

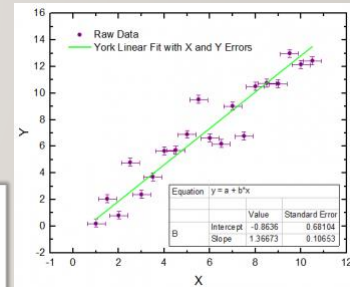
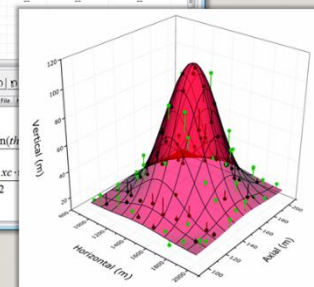
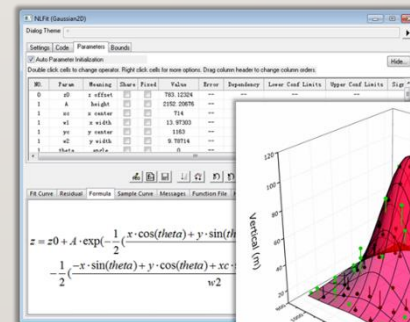
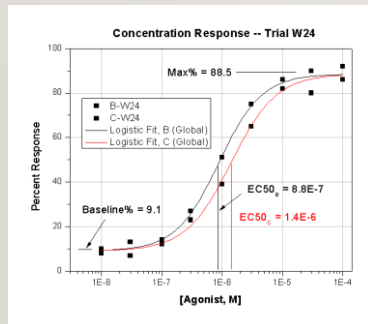
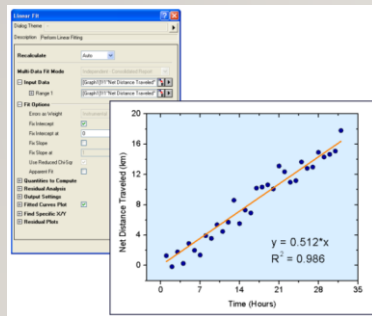
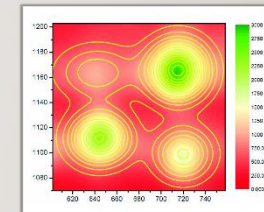
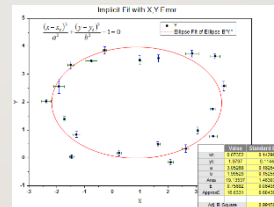
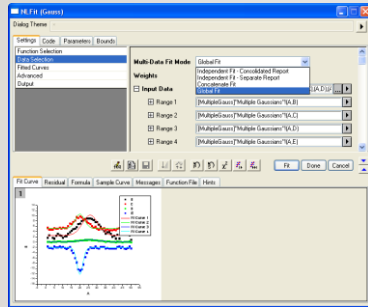
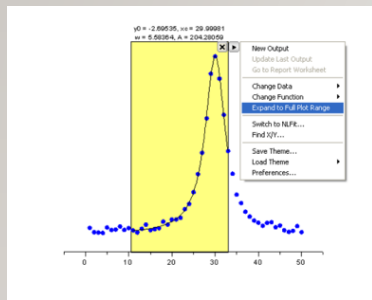
Origin支援的資料分析功能包括了

- Origin Gadgets (FFT，積分，或是Quick Fit等簡單的資料探索小工具)
- Statistic (統計相關功能):假設檢定/ANOVA/無母數統計分析/ROC/多變量分析/樣本規劃數目分析等(多數功能**OriginPro**才有)
- Curve Fitting (曲線擬合) (部分功能**OriginPro**才有)
- Signal Processing (訊號處理)
- Peak Analysis (峰值分析) (**OriginPro**可作**multi-peak fitting**和**batch fitting**)
- Mathematics (相關數值分析或運算)
- Data Manipulation (資料的整理和調整)
- Analysis Templates Creation (建立分析作業樣板)
- Batch Processing (批次處理)



ORIGIN/ORIGINPRO 的曲線擬合功能

Only OriginPro

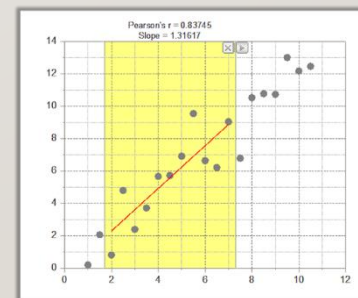
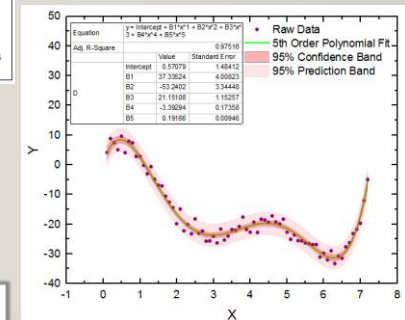
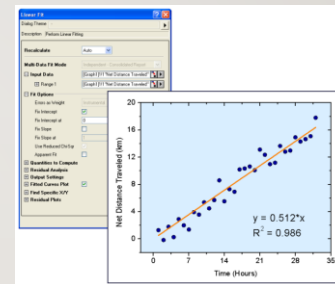


曲線擬合(CURVE FITTING)

- ▶ **線性與多項式擬合：** 使用者可以從工作表或圖面擷取資料，並求出一條最接近這些資料特性的函式繪製在圖面上，也可以對多組資料作分析比較。

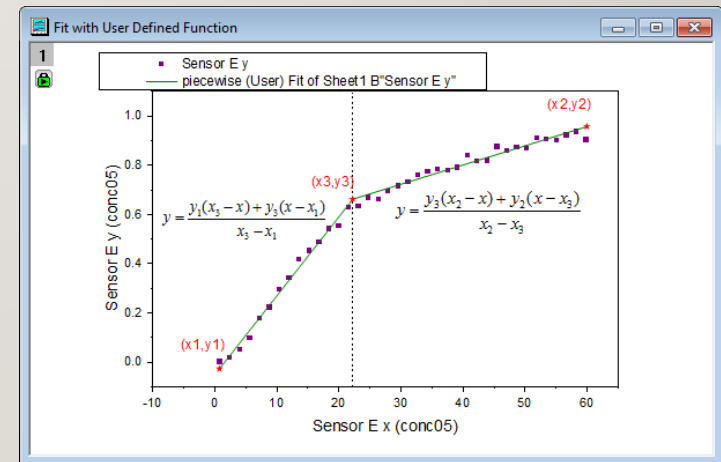
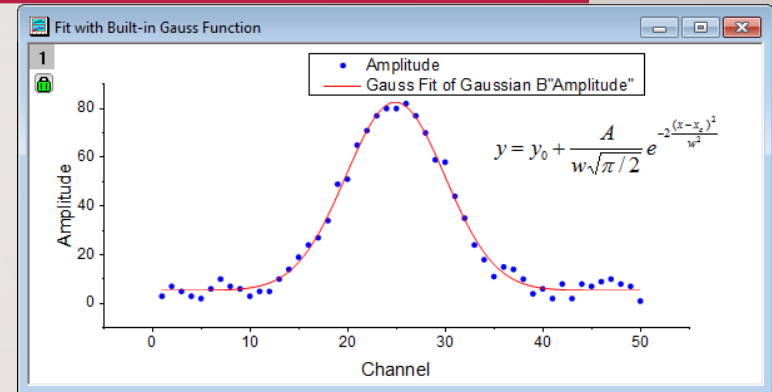
- ▶ **Quick Fit Gadget**

使用者可以在資料圖上定義一個子區間(Region-Of-Interest (ROI))並且針對這個區間做擬合和分析。

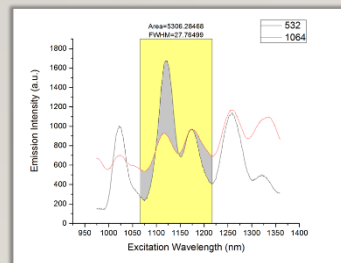
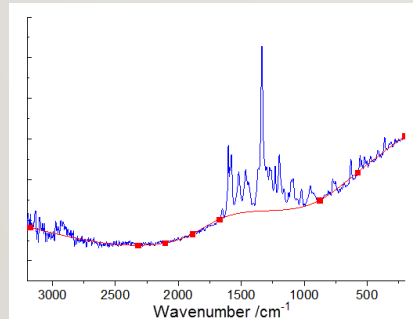
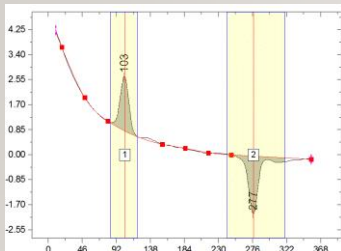
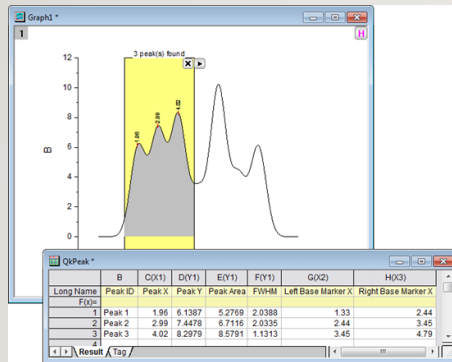
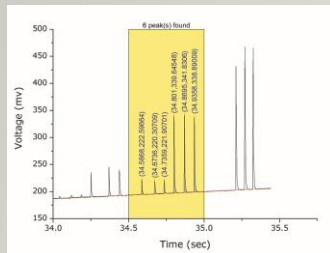


曲線擬合(CURVE FITTING)

- 非線性擬合：用Origin內建200多種函數作擬合之外，也可以用Origin的Fit Function Builder來建立自己的逼近函數。
- 自動化的擬合計算
- 擬合模型和資料集合之比較(OriginPro)
 - ✓ 哪一種函數擬合最適合？
 - ✓ 同一個函數哪個資料最適合？
 - ✓ 全部擬合函數排行榜

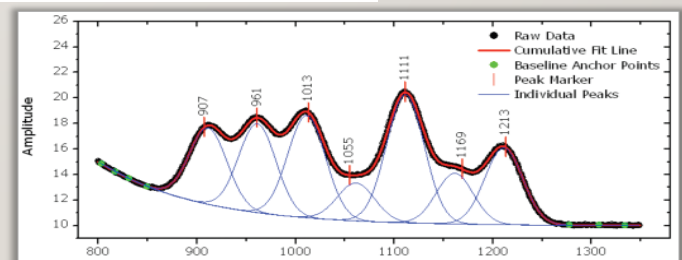
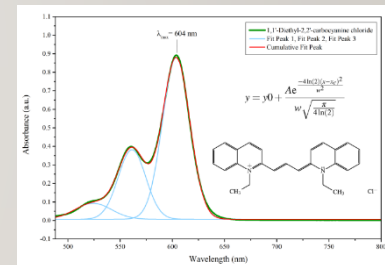
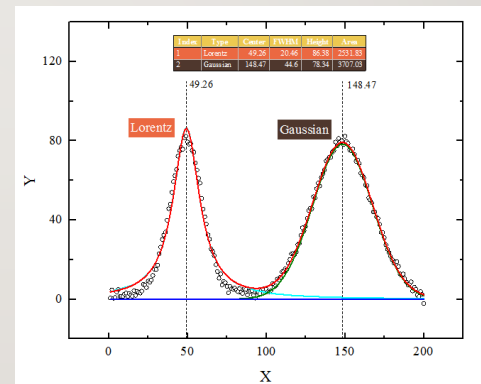


ORIGIN/ORIGINPRO 的峰值分析功能

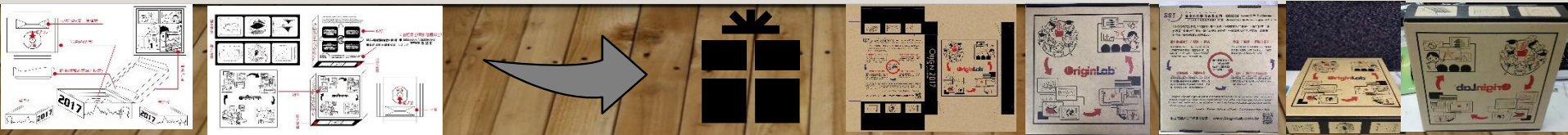


Only OriginPro

*峰值拟合(Peak Fitting ; 僅限於PRO版)



ORIGIN2023軟體新功能



Notable New Features

- Insert Worksheets in Graph or Layout
- Worksheet Enhancements
- Enhanced Project and Window Management
- Smart Skipping of Symbols for Large Datasets
- Double-Y graphs in a Single Layer
- Line-Symbol Plot with Automatic X Value Sorting

Notable New Features

➤ Angle Annotation Tool

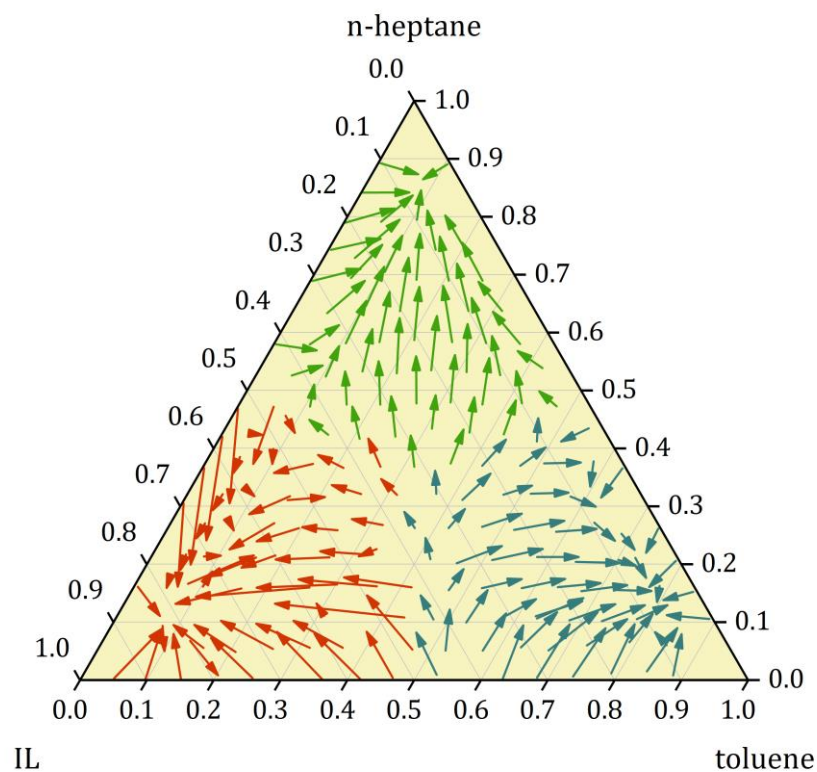
➤ Add Page or Layer Titles

➤ Improvements to Contour Plots

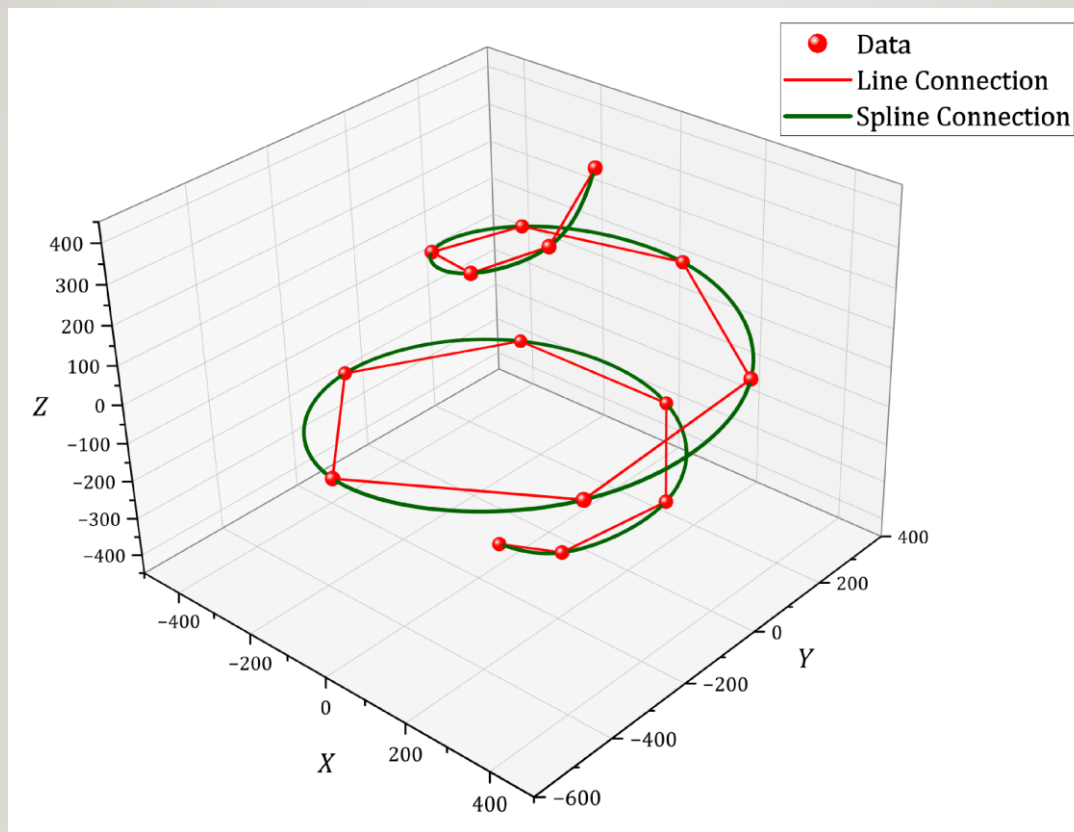
➤ Improvements to Exports

➤ Improvements to LabTalk Scripting

New Graph Types: Ternary Vector

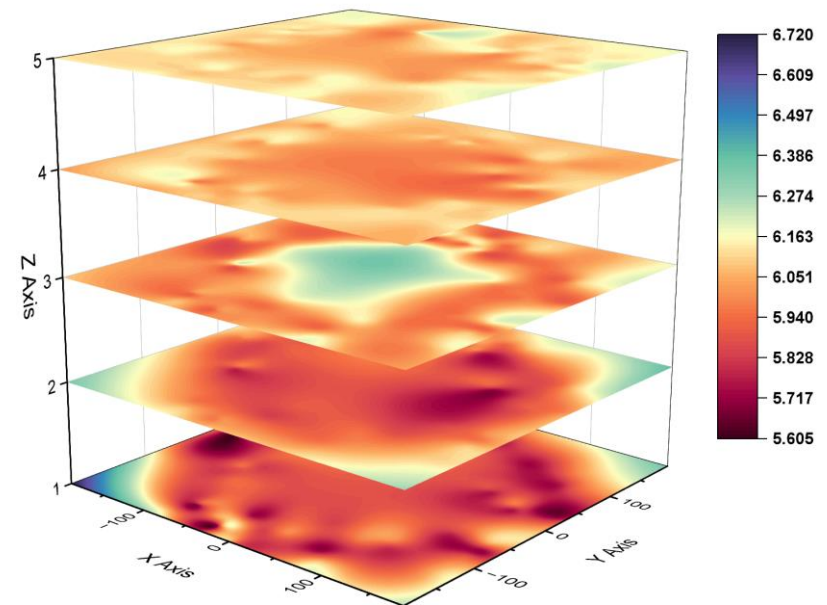
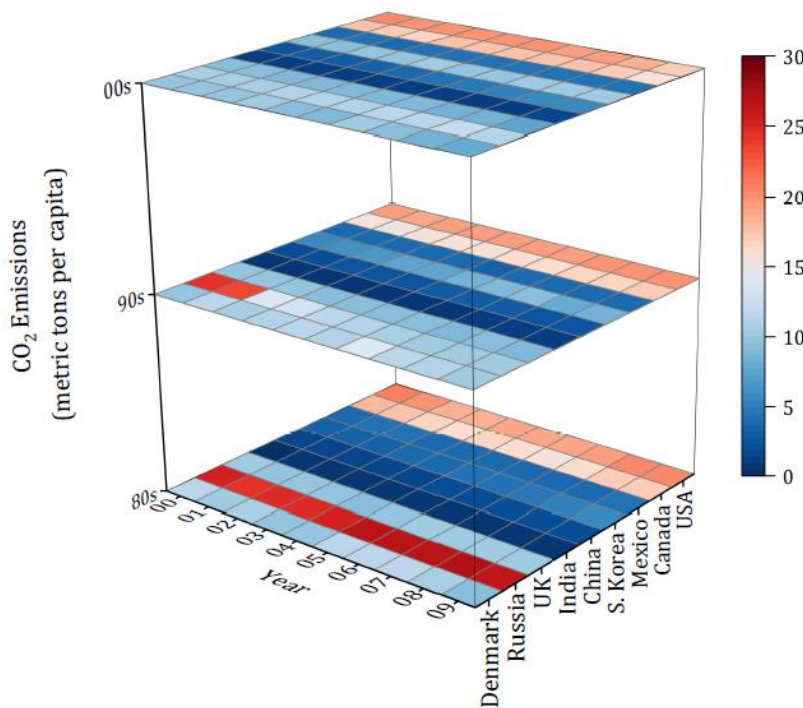


New Graph Types: 3D Line and Spline Connection



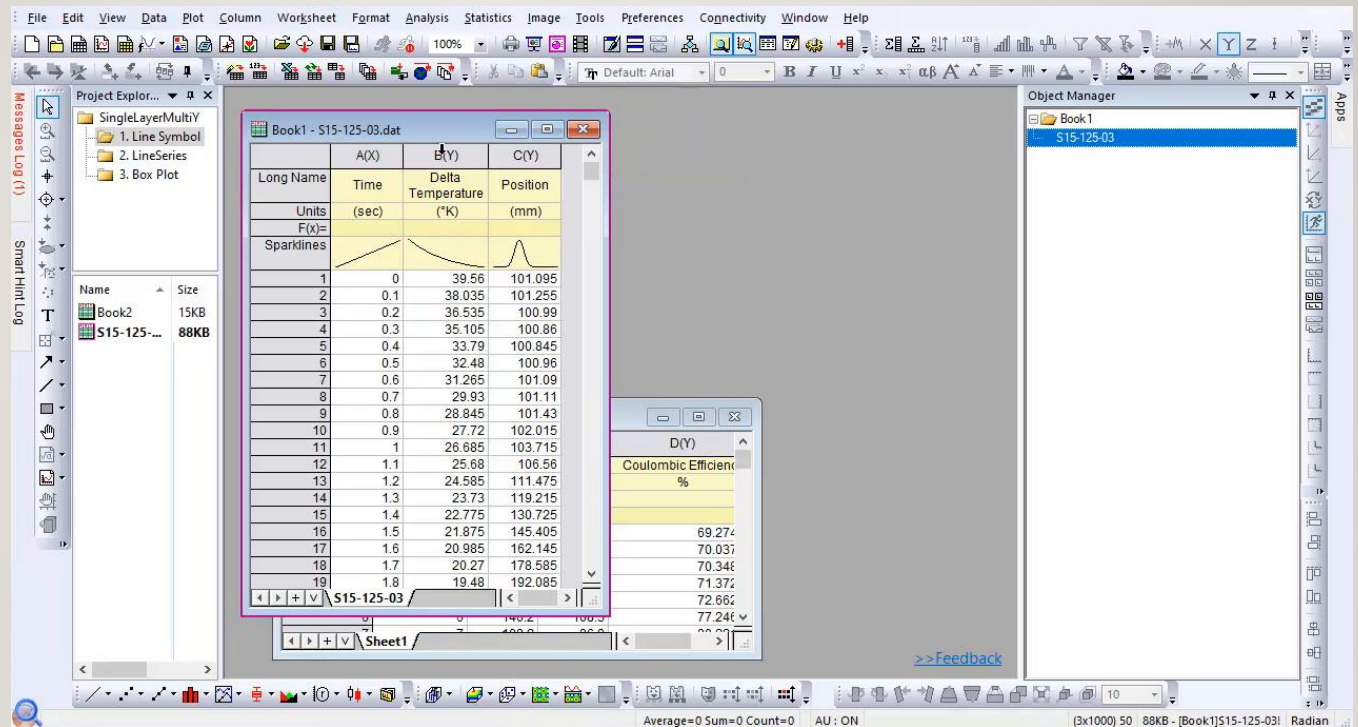


New Graph Types: Stacked 3D Heatmap/Surface



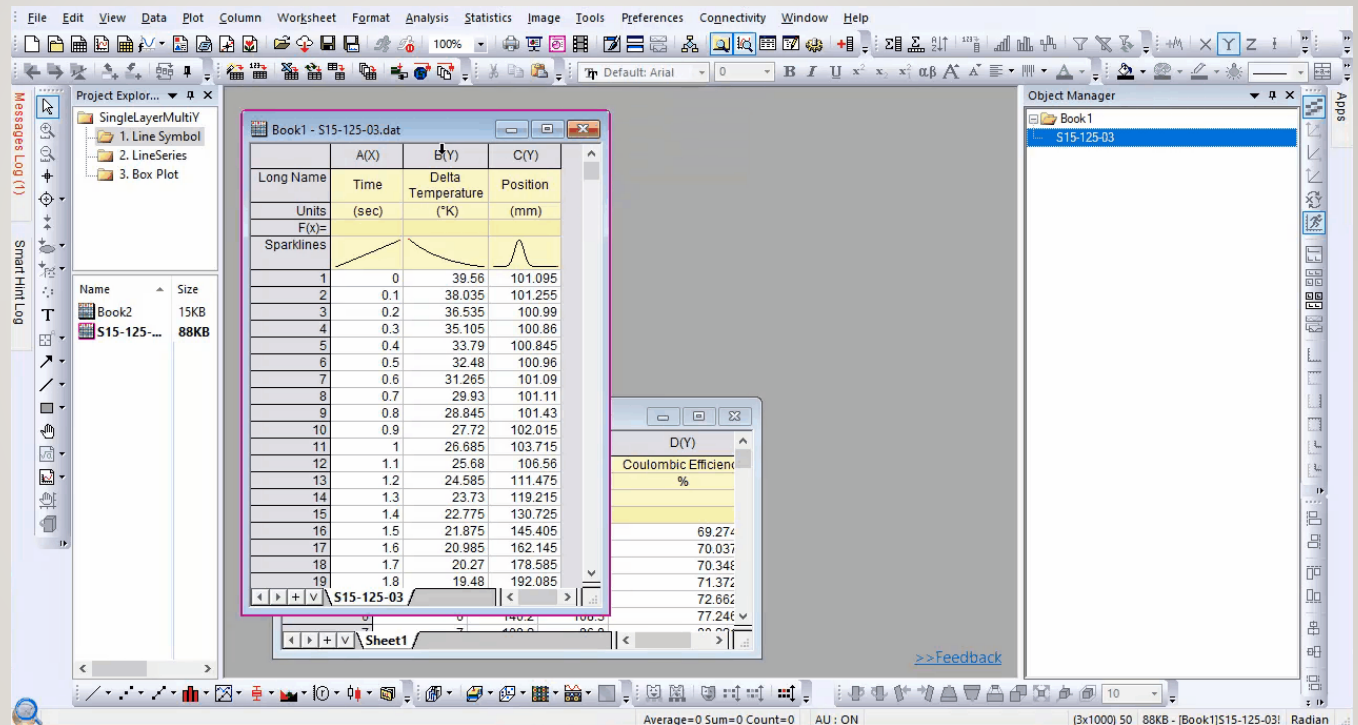
Double-Y Plots

- Set the scale of right Y to be independent of left Y
- Easily assign or switch plots to left or right Y
- Work with a subgroup of plots based on left or right Y axis



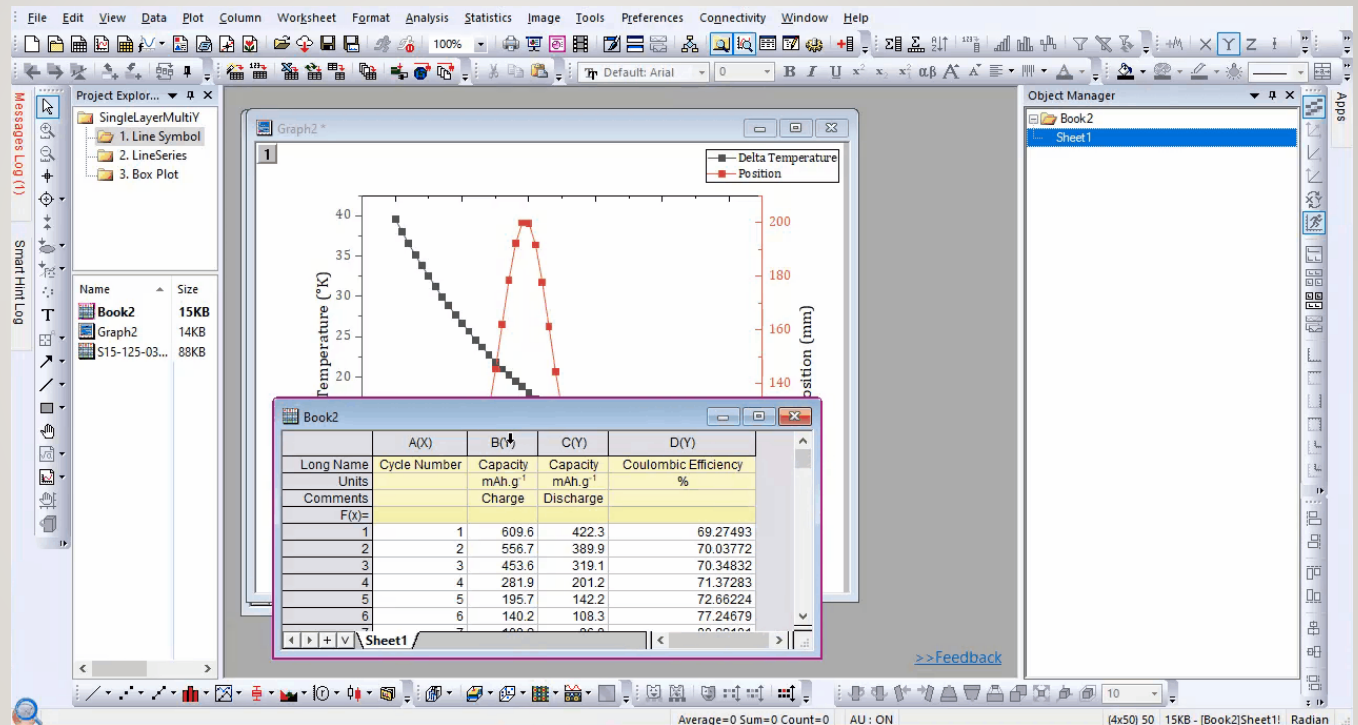
Double-Y Plots

- Set the scale of right Y to be independent of left Y
- Easily assign or switch plots to left or right Y
- Work with a subgroup of plots based on left or right Y axis



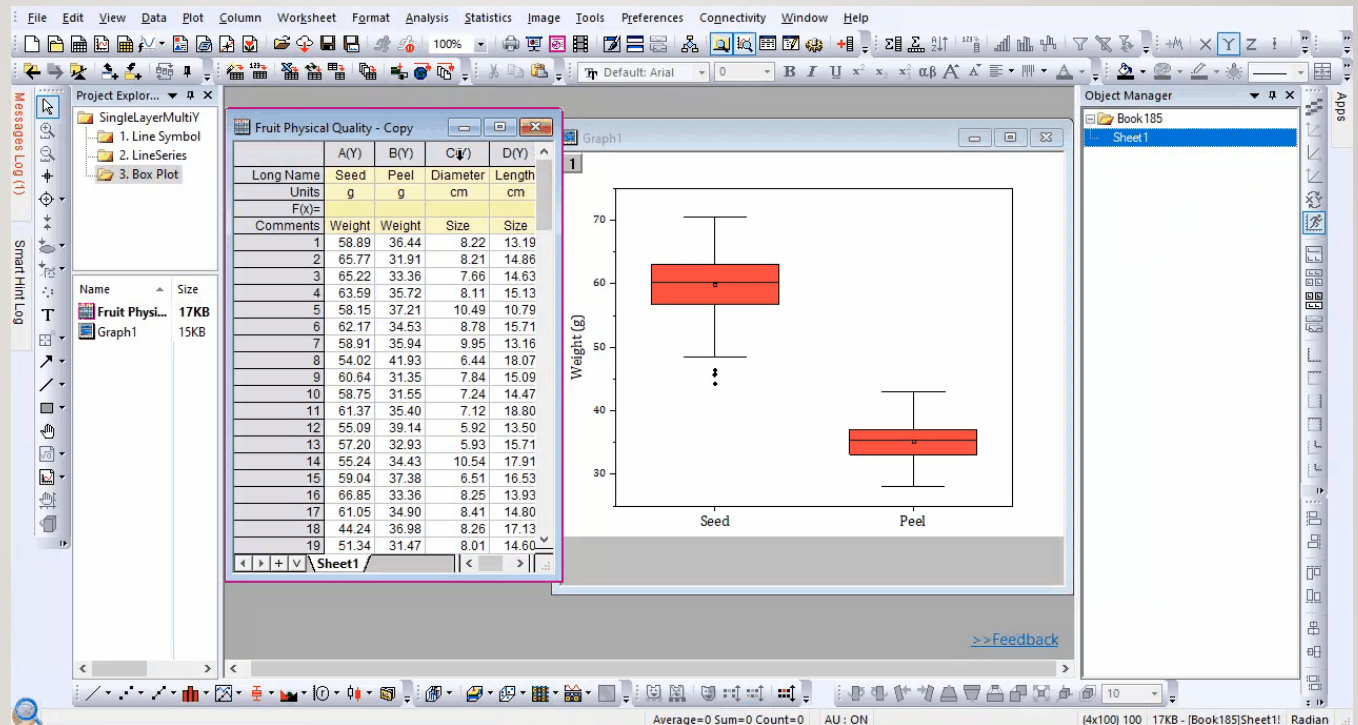
Double-Y Plots

- Set the scale of right Y to be independent of left Y
- Easily assign or switch plots to left or right Y
- Work with a subgroup of plots based on left or right Y axis



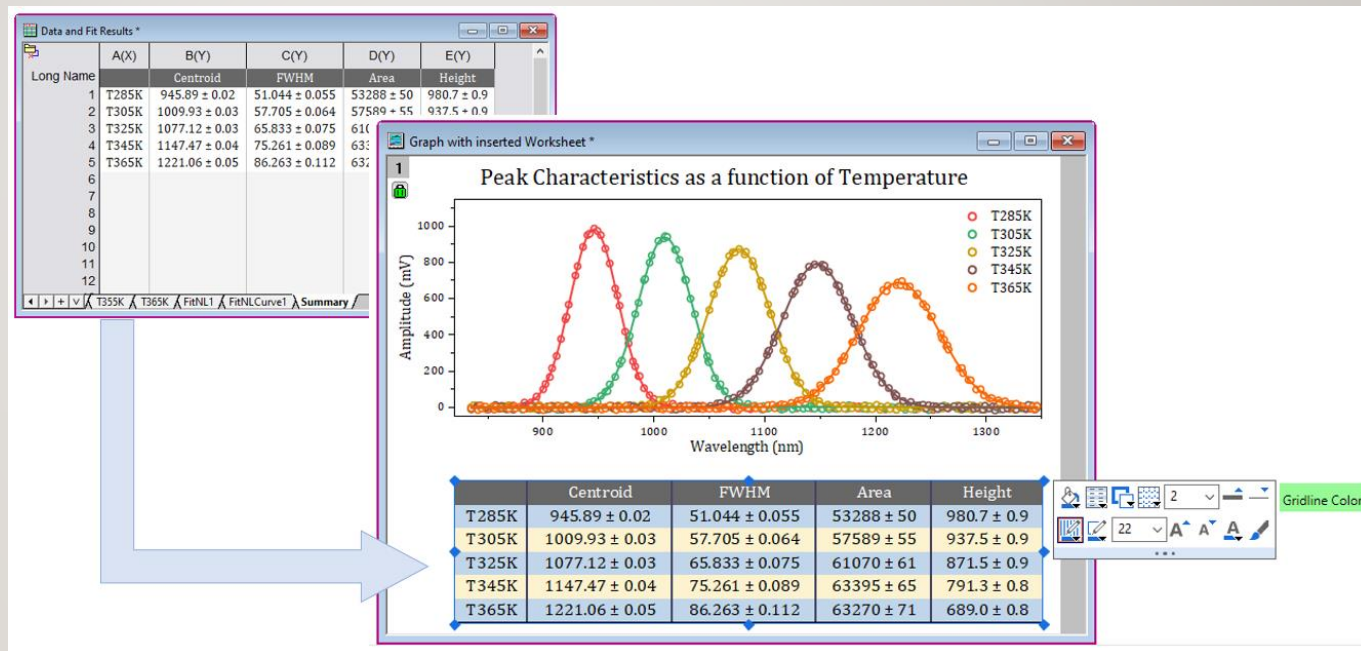
Double-Y Plots

- Set the scale of right Y to be independent of left Y
- Easily assign or switch plots to left or right Y
- Work with a subgroup of plots based on left or right Y axis



Insert Worksheets in Graph or Layout

- Improved sheet objects with hidden headers and margins
- New options and Mini Toolbar buttons to customize colors, grids, and frame
- Dynamic table size and grid formatting

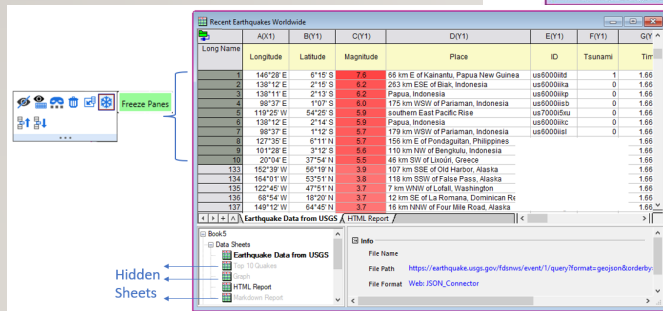
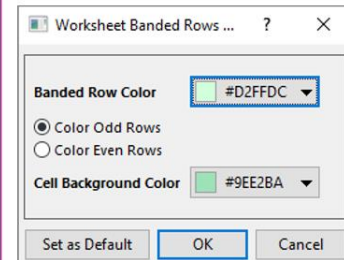


Worksheet Enhancements

- Banded Rows
- Worksheet Export to Image
- Copy Sheet or Selection as HTML/EMF
- Export to Excel with Cell Formatting
- Added Frozen Panes
- Hide Sheets

Book1 - Step01.dat *

Long Name	A(X)	B(Y)	C(Y)	D(Y)	E(Y)	F(Y)	G(Y)	H(Y)	I(Y)
	N total	Minimum	Maximum	Sum	Median	Mean	Standard Deviation	Kurtosis	
1 Sensor A	38	-0.01	0.12	2.07	0.056	0.055	0.037	-1.135	
2 Sensor B	38	-0.02	0.26	4.63	0.118	0.122	0.086	-1.192	
3 Sensor C	38	0.00	0.51	9.91	0.263	0.261	0.158	-1.189	
4 Sensor D	38	0.00	0.70	15.63	0.446	0.411	0.219	-1.091	
5 Sensor E	38	0.00	0.94	23.78	0.727	0.626	0.287	-0.297	
6 Sensor F	38	0.00	1.06	29.02	0.882	0.764	0.305	0.832	
7 Sensor G	38	0.00	1.17	34.79	1.032	0.915	0.301	2.597	
8 Sensor H	38	0.00	1.26	38.16	1.106	1.004	0.292	4.168	

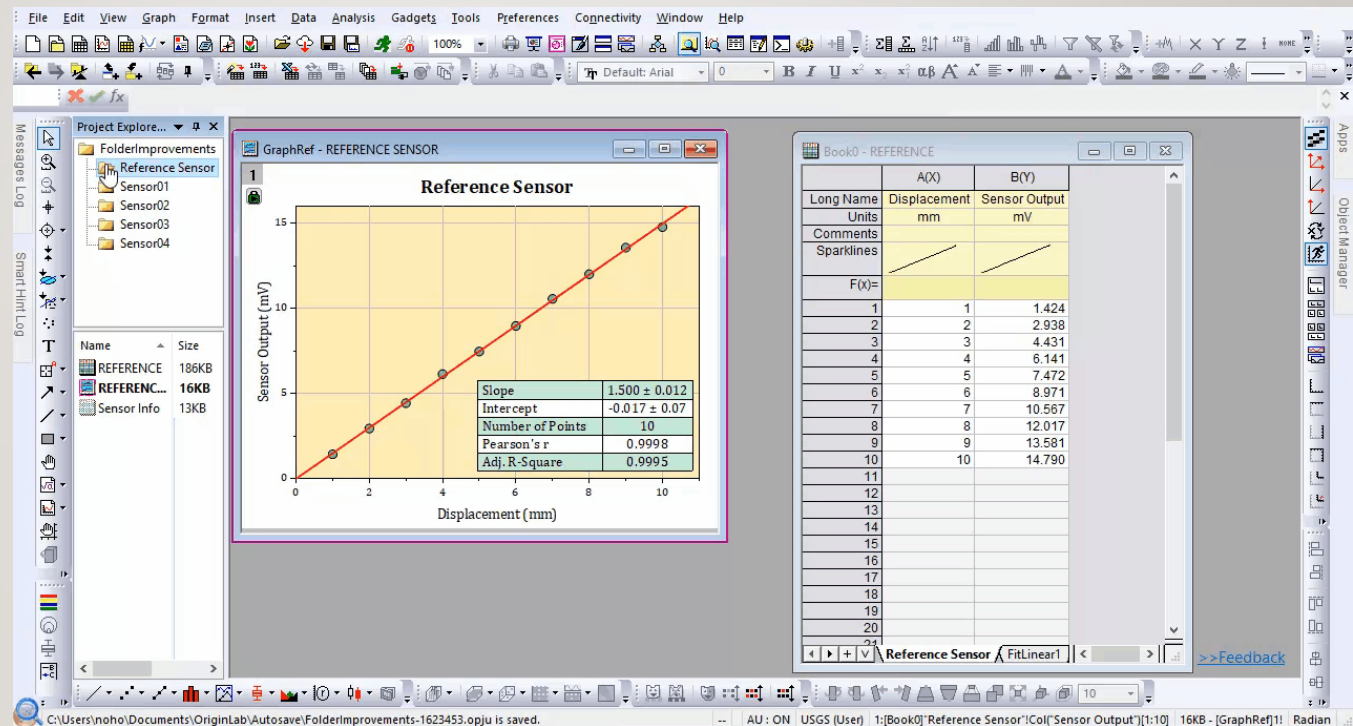


Worksheet exported as image file

	N total	Minimum	Maximum	Sum	Median	Mean	Standard Deviation	Kurtosis
Sensor A	38	-0.01	0.12	2.07	0.056	0.055	0.037	-1.135
Sensor B	38	-0.02	0.26	4.63	0.118	0.122	0.086	-1.192
Sensor C	38	0.00	0.51	9.91	0.263	0.261	0.158	-1.189
Sensor D	38	0.00	0.70	15.63	0.446	0.411	0.219	-1.091
Sensor E	38	0.00	0.94	23.78	0.727	0.626	0.287	-0.297
Sensor F	38	0.00	1.06	29.02	0.882	0.764	0.305	0.832
Sensor G	38	0.00	1.17	34.79	1.032	0.915	0.301	2.597
Sensor H	38	0.00	1.26	38.16	1.106	1.004	0.292	4.168

Enhanced Project and Window Management

- Folder Notes and Previews
- Navigate Folders using the Toolbar and Seesaw between Folders
- Show Graphs from Different Folders
- Duplicate Folders
- Pin Windows
- Restore Window Size and Position

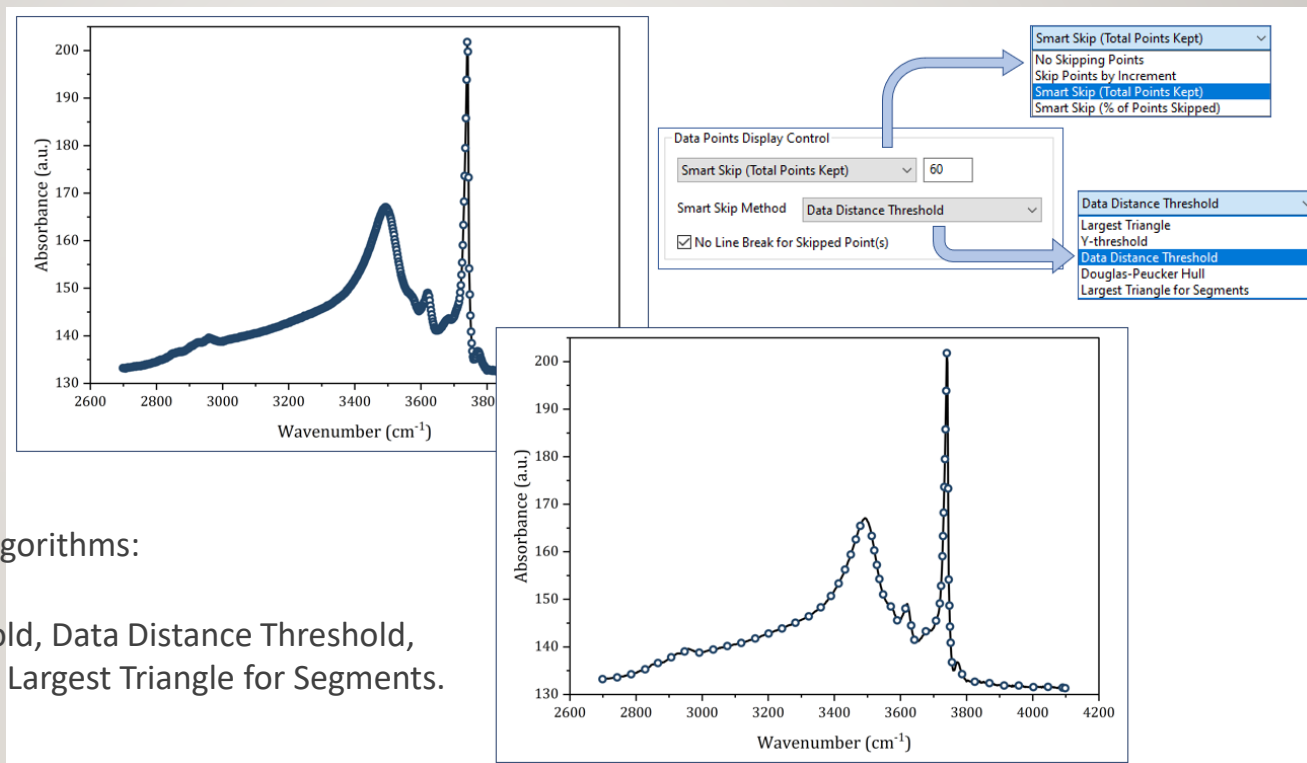


Smart Skipping of Symbols for Large Datasets

- Select between **Total Points Kept** or **Percentage of Points Skipped**

- Choose from multiple algorithms:

Largest Triangle, Y-Threshold, Data Distance Threshold, Douglas-Peucker-Hull, and Largest Triangle for Segments.



Line-Symbol Plot with Automatic X Value Sorting

- Apply X-value sorting to a particular data plot with this LabTalk script command:

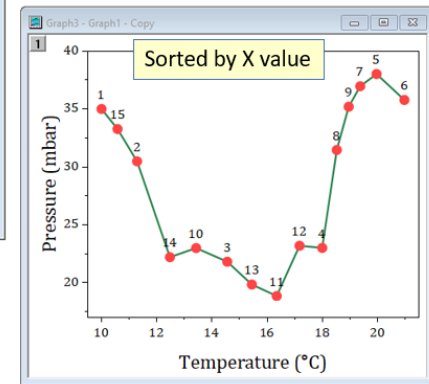
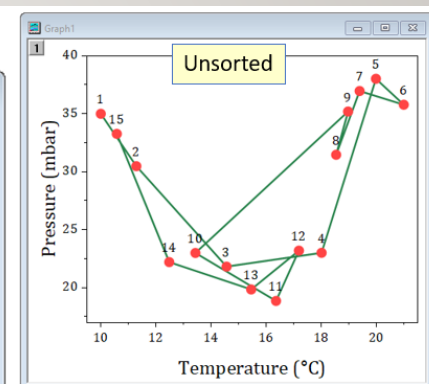
```
layer.plot1.line.sortx=1;
```

- Once sorted, the graph can be saved as a template for future use.

Book1 - Data Collected on 8/19/22

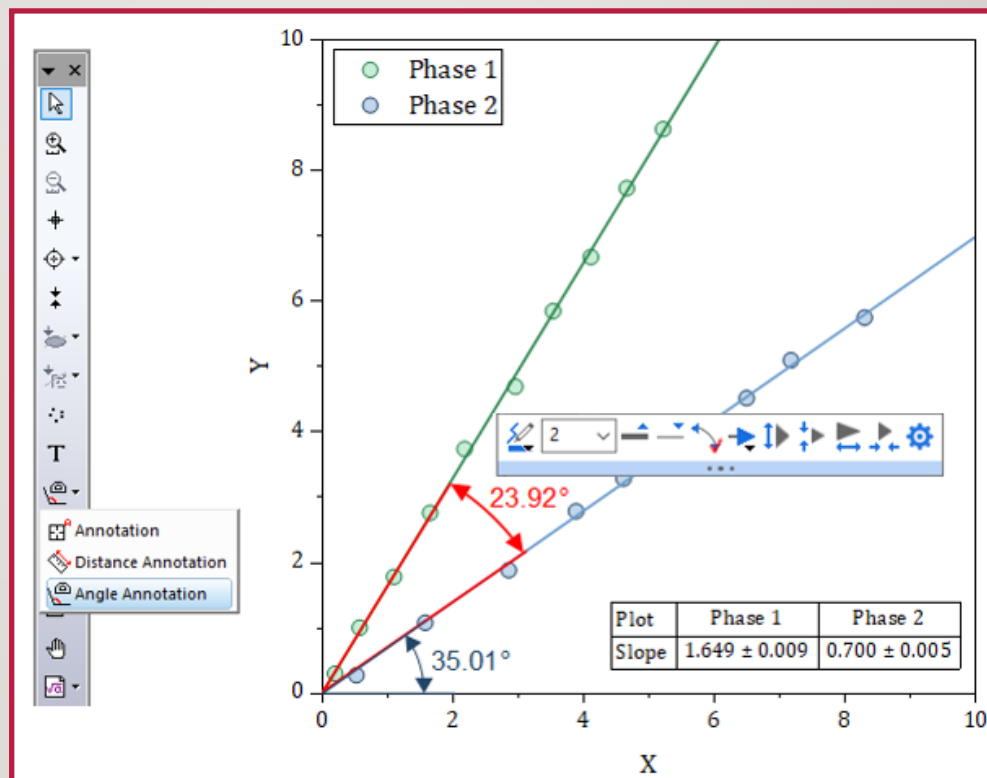
	A(X)	B(Y)	C(Y)
Long Name	Time	Temperature	Pressure
Units	HH:mm	°C	mbar
F(x)=			
1	00:00	10.00	35.00
2	00:30	11.29	30.48
3	01:00	14.56	21.81
4	01:30	18.00	23.00
5	02:00	19.97	38.02
6	02:30	20.98	35.78
7	03:00	19.38	36.97
8	03:30	18.53	31.46
9	04:00	18.96	35.20
10	04:30	13.43	22.99
11	05:00	16.35	18.85
12	05:30	17.18	23.19
13	06:00	15.45	19.84
14	06:30	12.48	22.20
15	07:00	10.58	33.27

Measured data



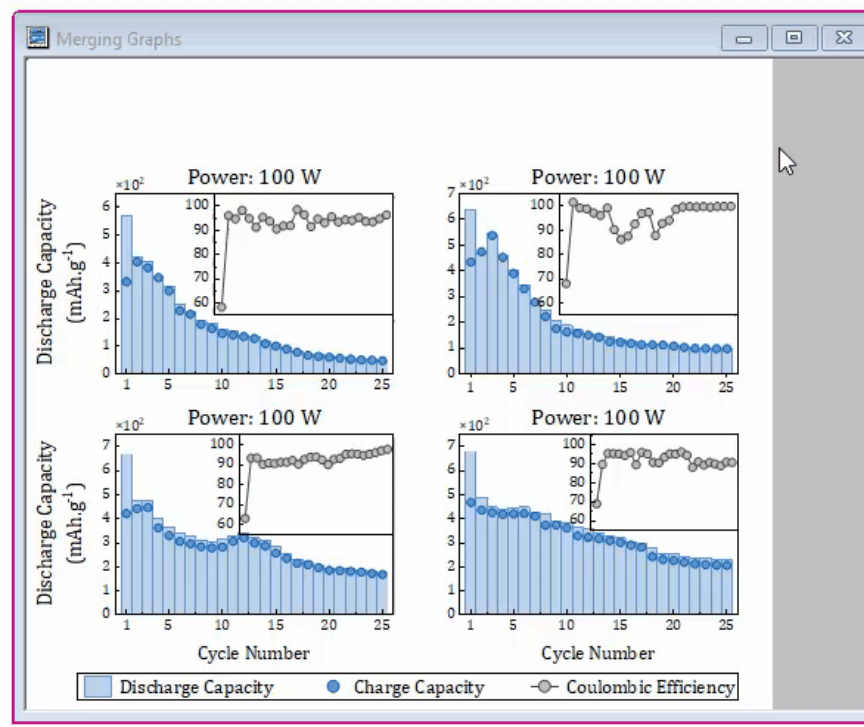
Angle Annotation Tool

- Click to select three points in a graph to add the angle annotation.
- Further customize the annotation using the Mini Toolbar or properties dialog



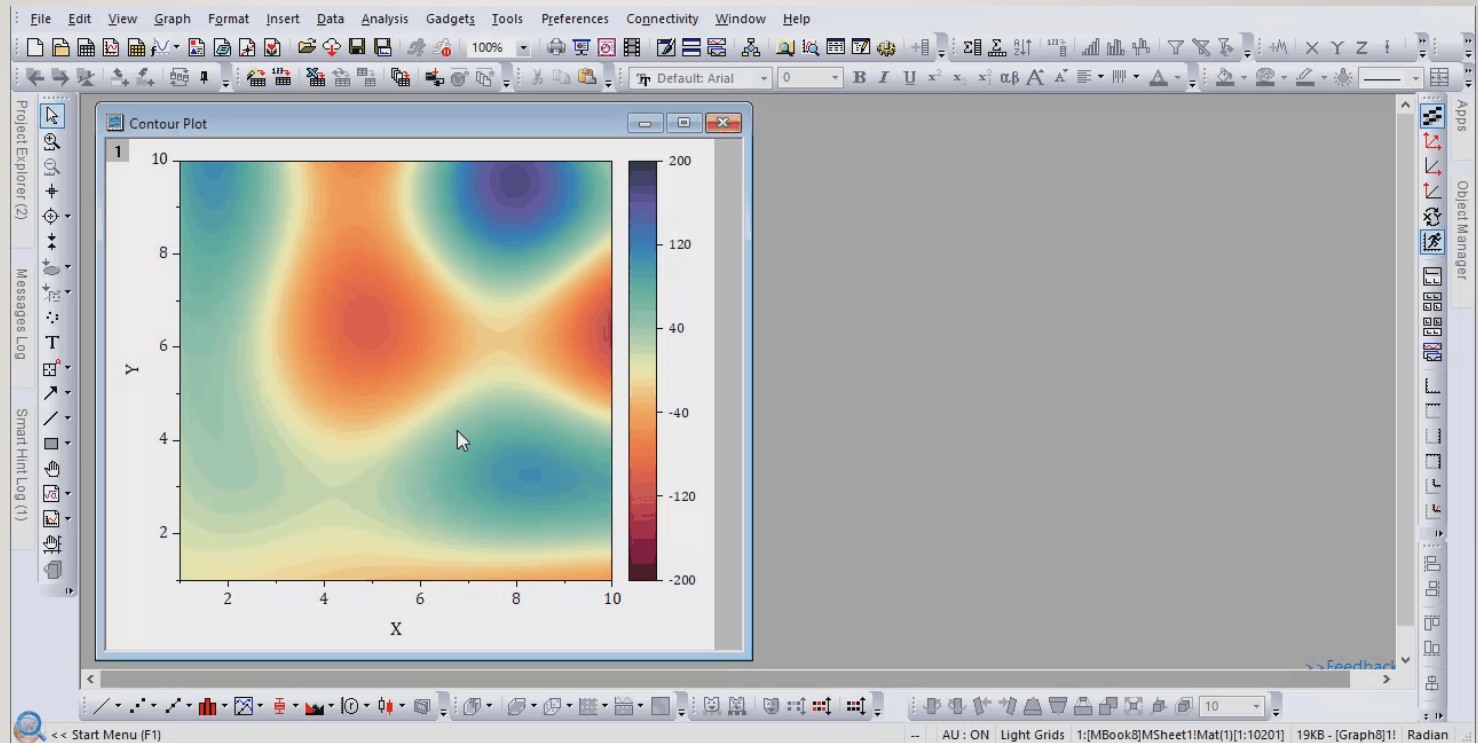
Add Page or Layer Titles

- Use the Mini Toolbar button to **Add Layer Title** or **Add Page Title**
- A center-aligned title box will be added, with wrap text enabled
- The size of the box can be set as a % of the layer/page and will rescale
- The text will auto wrap



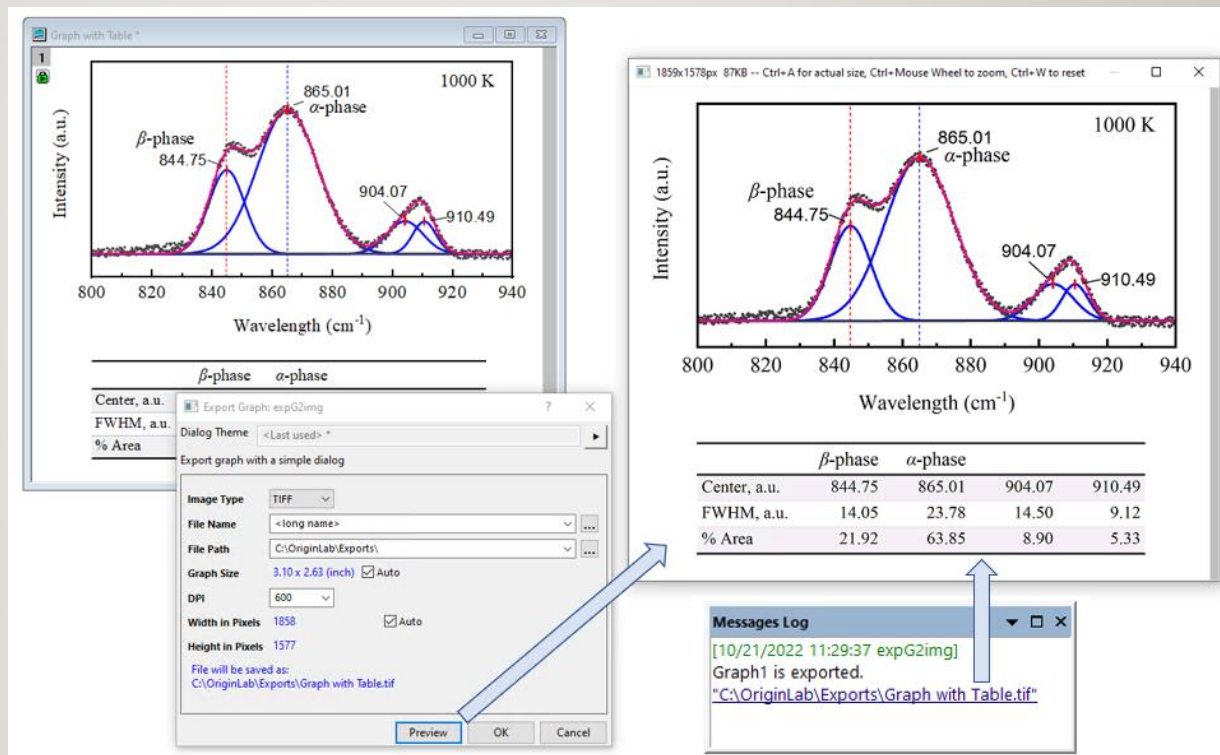
Improvements to Contour Plots

- Insert multiple custom contour levels with options for turning on lines and labels
- Mini Toolbar for customizing line and label properties and extract data for contour lines at a selected level



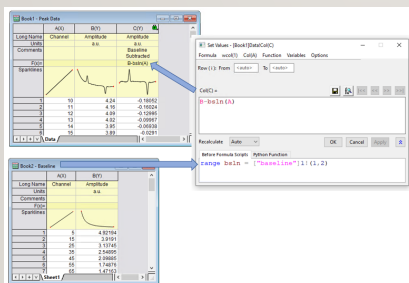
Improvements to Exporting

- Built-in viewer for preview of raster and EMF exports
- Clickable link in Messages log to open exported file or folder
- Hot key to export graph with last-used theme
- Worksheet export as Image supports frame and margin control
- Export video from a browser graph, multi-frame image, or multi-frame matrix



Improvements to LabTalk Scripting

- Improved Script Window with Unicode support, syntax coloring, improved font and font size control
- Select columns by LabTalk script
- Window Long Name in the Range Notation prioritizes the window in the same folder.
- Execute scripts stored in worksheet cells using: Labtalk://<script>
- Named range to specify 3D plane position.



```
Script Window : LabTalk
File(Text) Edit Hide Tools

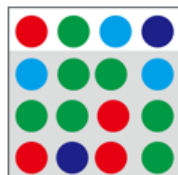
// Normalize Y columns and compute area

// Loop over all columns in worksheet
for(int iCol=1; iCol<=wks.NCOLS; iCol++)
{
    range rCol = wcol(iCol);
    // Check if it is a Y column
    if( rCol.type == 1 )
    {
        // Normalize data to between 0 and 1
        rnormalize irng:=rCol method:=1 orng:=rCol;
        // Integrate to find area
        integ1 iy:=rCol oy:=<none>;
        type Column %(rCol[C]$) has area of $(integ1.area, .2);
    }
}
```

New Apps



Effect Size
for ANOVA



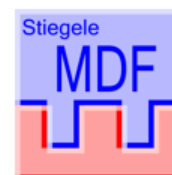
Bootstrap
Sampling



Propagation
of Error



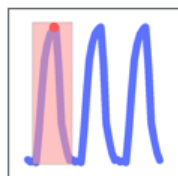
Steel-Dwass
Test



Stiegele MDF
Connector



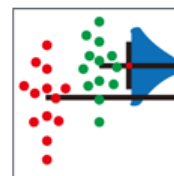
Classify Points
in Graph



Pulse Fit



Torsion Angle
Wheel Plot



Gardner-Aktman
Plot

Other Features and Improvements

General

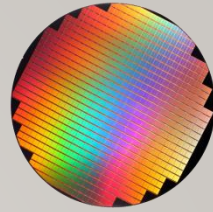
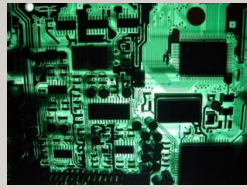
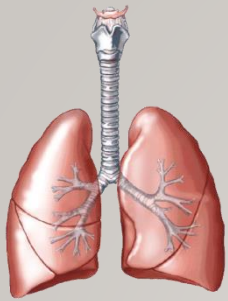
- Wrap rich text in worksheet
- Sparkline, renaming and post script control in Data Connector
- File Path Link in Cell
- Clickable links on Messages Log
- Tooltip when mousing over menus
- Options dialog for Protected Worksheet properties
- NetCDF import now supports yearly data nc4 files
- XML import now supports importing metadata node
- Copy and Paste-Link metadata values from Book Organizer to Worksheet cells
- High resolution toolbar button on 4K monitors

Graphing

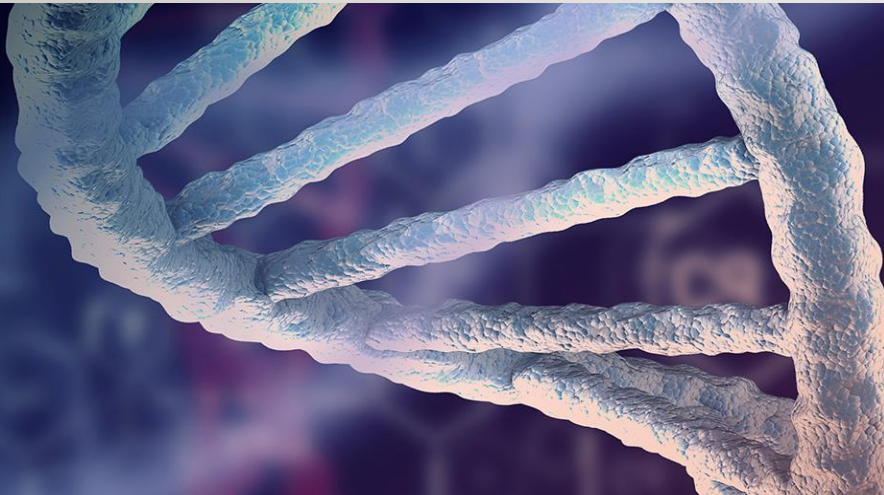
- Alternate sides to show ticks and labels
- Turn off selection for layer, plot, text, etc. using Mini Toolbar
- Layer arrangement direction
- Stack plot horizontally
- Ctrl+Alt+G to export graph with last used theme
- Asterisk Bracket shape control
- Insert user-defined color block in Legend
- Set default reference line style
- Build color improvements

Data Manipulation

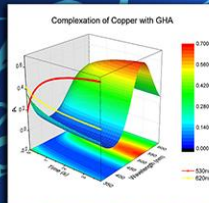
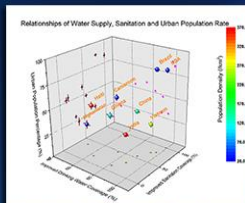
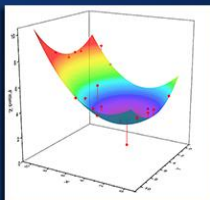
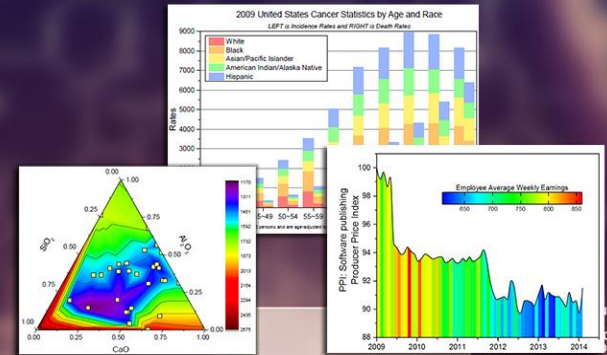
- Move rows up/down
- Manage multiple sheets together
- Normalize data by Group
- Merge columns by median and multiple quantities
- Unstack column output improvements
- Convert multiple Z data to matrix
- Cluster gadget with color mapped Z value stats
- Create linked matrix from ROI in image window

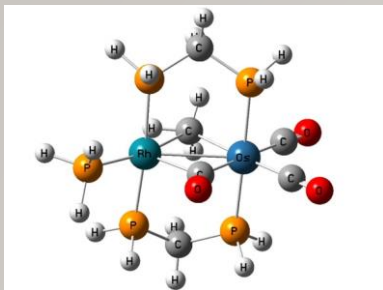


ORIGIN/ORIGINPRO



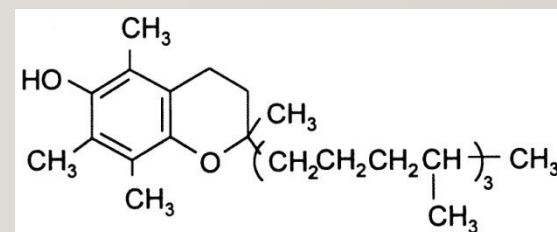
0101010111111111
111101010101010101
010001110101010101
101011010101010101
1011010111
11111000101011110101
1011010101010101
1111010101010111010
11010100100101011
1101010101010101
001010101010101
101010101010101





Origin/OriginPro

化工材料



材料結構特性的描述

- 客戶單位：北卡羅來那州立大學材料科學與工程學系
- 問題：如何編譯並且展現大型的資料和變數之集合，也需要產生圖表用才能比較原始資料和模型的資料
- ✓ 解決方案：運用多座標軸功能與**3D**曲面色彩圖展現多個變數資料

ORIGIN

軟體的關鍵功能應用：

- Multi-Axis graphs
- 3 Dimensional Plots
- Colormap Surfaces
- Multiple panel graph
- Inset Graph Publication-quality graphs

材料結構特性的描述

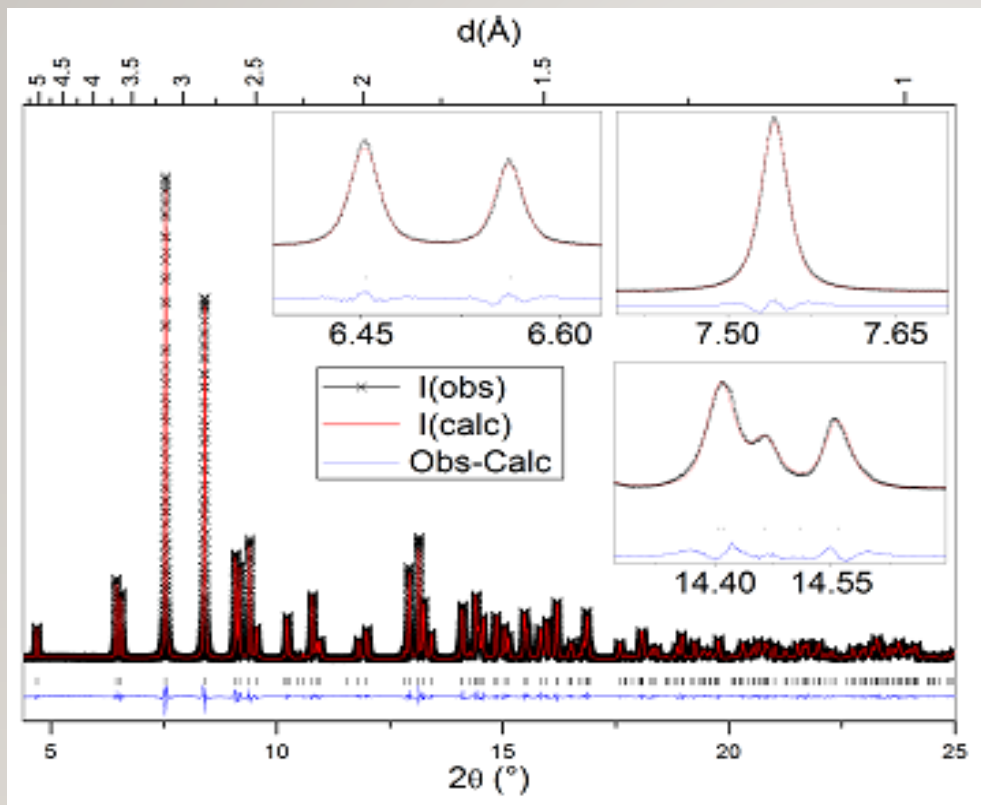
JASON NIKKEL，是一位受JACOB JONES教授指導的北卡羅來那州立大學研究生，他成功的運用ORIGIN編譯大量且複雜的資料，並且用平易近人且專業的方式呈現出來。

- 他的研究團隊主要是在探討材料結構的特性，研究團隊運用**Origin**對資料進行編譯和組織，並且建立了整合了原始資料，模型資料以及比較兩者差異的優雅圖表。
- 同時由於實驗資料(標註為 2θ 的x軸資料)以及這些實際上反應的數值(d-spacing)之間的關係並非線性，研究團隊運用了**Origin**的多重座標軸功能追加了一條補充的x軸在圖面上用來說明非線性的關係。



這項功能讓他們可以像(下圖一)之中那樣簡潔的說明非常複雜的晶格結構關係。

材料結構特性的描述

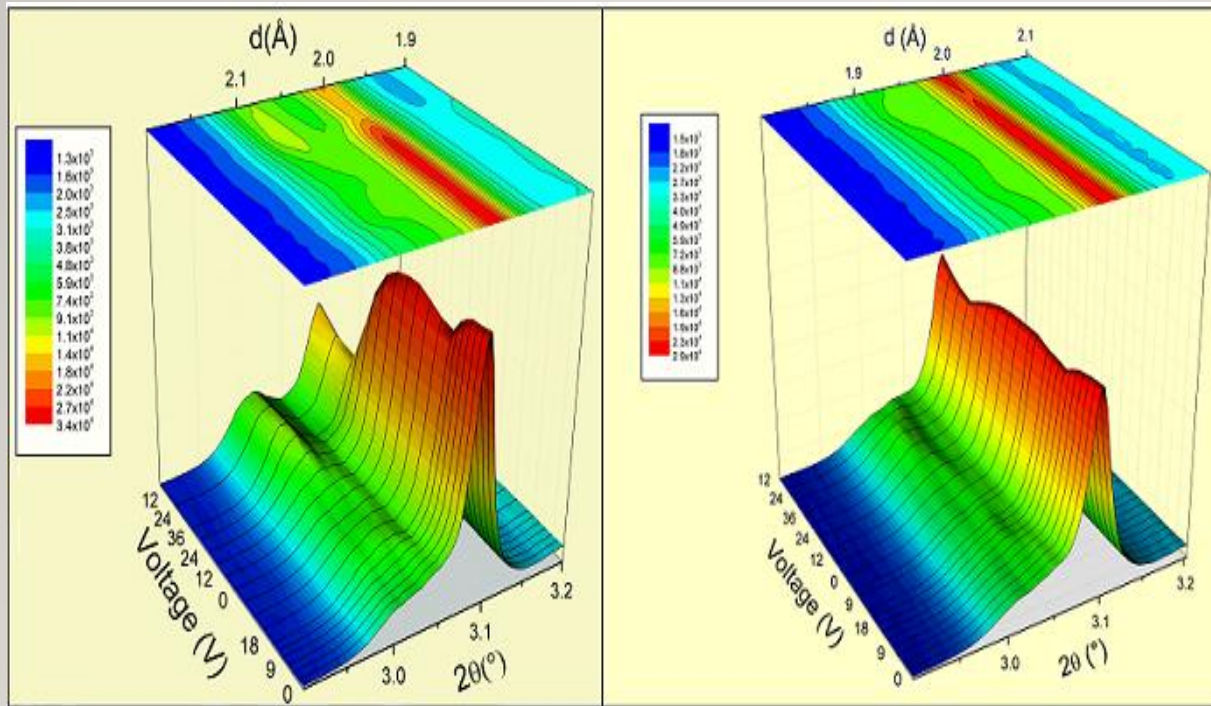


研究團隊主要用現場散射的技術，研究結構與特性的關係；發現這些實驗主要是在探討大型的多變量問題，通常難以用一般的二維圖形作說明。

- 因此研究團隊需要三維的圖形作說明～Origin的功能可以滿足他們的需求，**最新的OpenGL 3D繪圖功能**：讓研究團隊可以用視覺化的方式把複雜的結構特性關係優雅的描繪出來(下圖二)。

圖一，運用Reitveld refinement method粹取晶格資料並且描繪出兩組資料的共同峰值位置

材料結構特性的描述



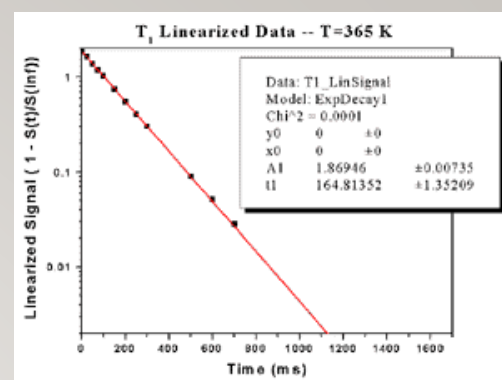
圖二：用來展現特定晶格峰值的3D曲面圖，圖形中展示了有經過機械夾持以及沒有夾持的鉛-鉻-鈦材料的差異

成功的運用
ORIGIN軟體

編譯大量且複雜
的資料

用平易近人容易
理解且專業的方式
呈現出來。

尖端電池技術研究



- 西北大學在研究更有效率的電池成分工作上必須分析大量的電解質材料的相關資料和數據。
- 由核磁共振儀以及其他實驗得來的不同材料和成分的大量數據的分析中可以找到更好的添加物配方以促進離子的運動讓電池更有效率。

問題: 分析數據的工作極為繁瑣枯燥，並且需要大量時間人力。

- 西北大學的研究人員在**Origin**的環境裡以巨集的方式開發了自動化的數據分析軟體套件，只要按一個按鈕，就可以自動分析量測所得的大量數據。

Book 1 | CHEMBL Bioactivity Search Results [5494]

Long Name	Data (Reader)	Molecule Image
MOLWEIGHT	454.47087	
PSA	121.38	
ALOGP	5.197	
JOURNAL	J. Nat. Prod.	
ORGANISM	Homo sapiens	
ASSAY	B	
TARGET_TYPE	PROTEIN	

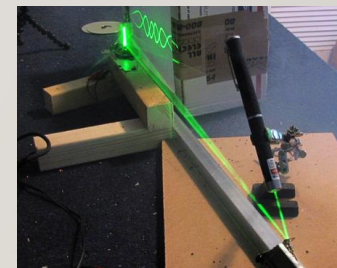
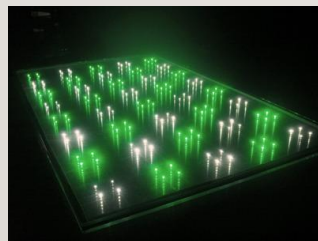
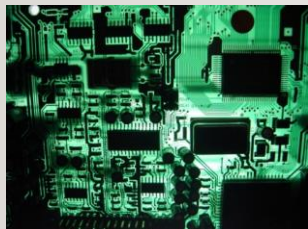
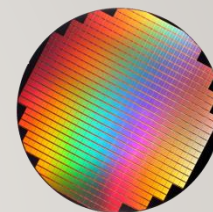
- 化學相關領域的客戶經常會需要參考圖形化的分子結構式資料以及各種成分的物理特性～作為評估的依據。
- 一位在頂尖的製藥企業任職的客戶使用了第三方的DLL函式庫配合Origin C在Origin的環境裡撰寫了極為方便的工具程式。
- Origin的環境和彈性：這位客戶建立了一個可以在Origin的環境裡讀取SMILES格式的資料重建圖形，並且同步的顯示各種成分的物理特性的便利功能，以供研發工作參考。

Biosci - Sample Size with Series - QM Images						
Long Name	QW1	QW21	QW31	QW4	QW51	QW61
	COMPOUND KEY	MOLWEIGHT	CANONICAL SMILES	Molecule Image	ALOGP	PSA
1	80	404.46333	<chem>O=C1OC(C=CC(=O)OC2C=CC(=CC=C2)C(=O)OCC2=CC=CC=C2)C(=O)O</chem>		1.249	141.14
2	22	401.4069	<chem>O=C1OC(C=CC(=O)OC2C=CC(=CC=C2)C(=O)OCC2=CC=CC=C2)C(=O)O</chem>		0.258	145.44
3	49	381.4051	<chem>OC1=CC=C(C=C1)C(=O)OC2C=CC(=CC=C2)C(=O)OCC2=CC=CC=C2</chem>		1.409	107.98
4	7	337.32414	<chem>OC1=CC=C(C=C1)C(=O)OC2C=CC(=CC=C2)C(=O)OCC2=CC=CC=C2</chem>		0.109	136.22

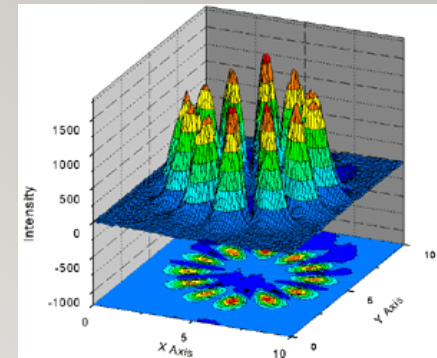


Origin/OriginPro

光電領域

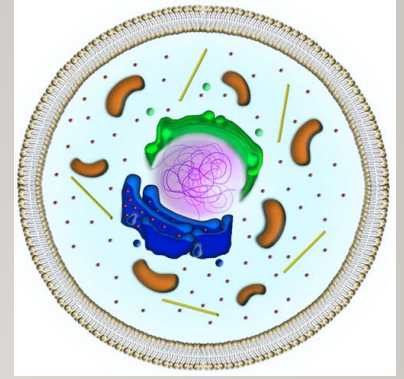
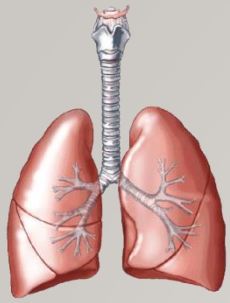


二氧化碳雷射不穩定性分析



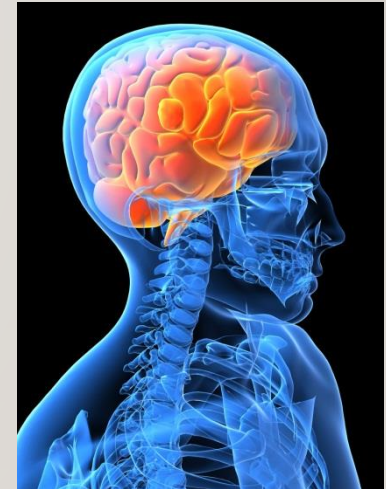
- 義大利的國家光學研究院(National Institute of Optics, NIO)對二氧化碳雷射的特性做研究設法提高設備的效率。
- 分析蒐集得來的資料發現雷射光束在切面上的強度隨時間和位置有預料之外的變化
- ▶ **NIO利用Origin重建了光束截面的強度等相關資料繪製了3D以及輪廓圖。**

研究成果提供設計或運用二氧化碳雷射的專業人士極佳的參考資訊。

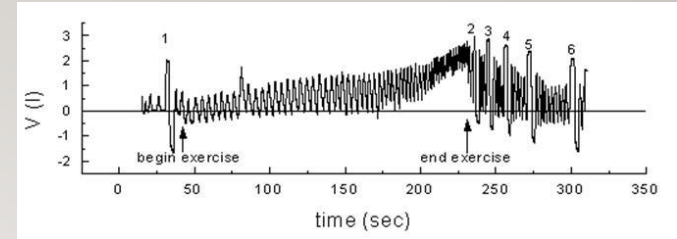


Origin/OriginPro

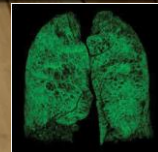
生醫科學



慢性阻塞性肺病的研究



- 位於加拿大蒙特婁的McGill大學希望對於慢性阻塞性肺病有進一步的研究，找出協助患者減輕不適感的方法。
- 患者呼氣時無法完全排出廢氣，導致吸氣困難並且產生不適感，並且也讓血液中二氧化碳濃度偏高。研究必須以健康的志願者配帶阻流器以模擬呼吸不順暢的狀況，並且在不同的環境下模擬不同的運動狀況蒐集資料。
- **Origin**可以安裝在筆記型電腦裡讓研究人員攜帶到非實驗室的環境，即時的收集資訊並且在同一個軟體平台下分析處理，大幅提高研究的便利性。
- 研究人員藉由Origin的協助了解了不適感的成因，進而發展出一套運動協助患者復健。



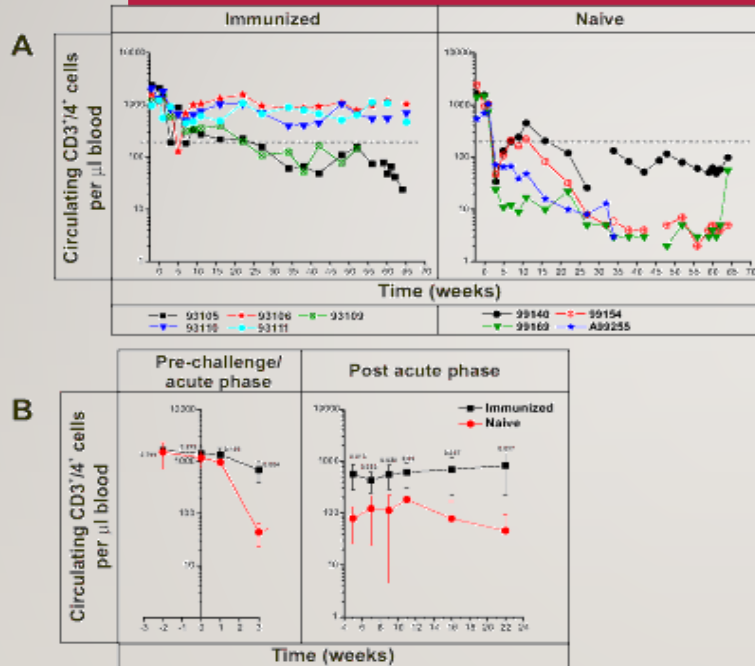
愛滋病疫苗研究

- **Washington National Primate Research Center** 的一群研發人員在愛滋疫苗的研究上運用了**Origin**軟體。
- 對於病毒感染的狀況作分析，亦即對於**CD4+T**細胞的損失狀況作研究可以作為愛滋發病的指標。
- 研究小組用血液分析量測血球細胞數量和血紅蛋白級數，以及用流式細胞儀鑑定白血球中的特殊成分來界定血液中**T**輔助細胞的數量。

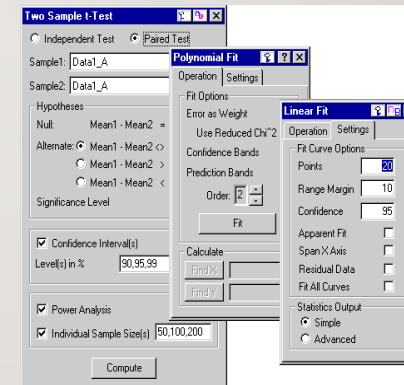
研究的過程中**Origin**的視覺化和資料分析功能提供了研發人員很大的幫助。

愛滋病疫苗研究(續)

Figure 1: Sheikh et al



- Origin的雙面板圖提供了一個絕佳的環境比較分析資料。



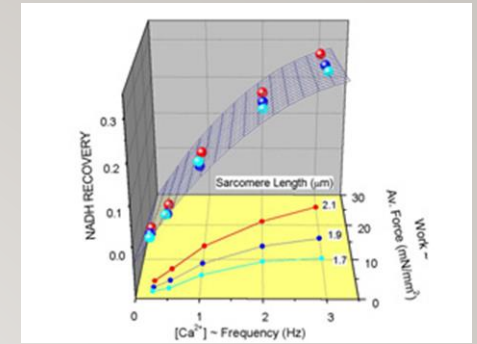
- **Origin**的曲線擬合和數值分析功能對於歸納和解讀產出資料有很大的幫助

心臟產生能量的原理

- 任職於美國伊利諾州芝加哥的Loyola大學的Dr. Rolf Brandes領導的研發團隊，運用Origin在他們的研究工作上。Dr. Brandes的團隊試著找出心臟在負荷變重時如何管理和管制產生能量的機制以及這個機制和心臟疾病的關係
- ▶ 細胞中的基礎能量是透過粒腺體進行氧化磷酸化的作用產生，而通常其效率是由二磷酸腺苷(ADP)所控制
- ▶ 研發團隊想驗證粒腺體內的鈣離子濃度的變化和NADH的產生率是否有正面關係



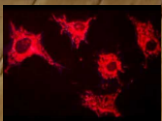
心臟產生能量的原理(續)



- ▶ 研究團隊運用螢光光譜法收集組織中的資料，並且運用Origin做原始資料的前處理和分析以及擬合的工作
- ▶ 研究團隊必須先把影像資料加以處理比對，擷取資料並且數值化，再作進一步分析，人工處理資料耗費大量時間又容易出錯

Origin軟體讓很多工作變成自動化、依靠研究人員自己撰寫所需的功能，讓資料分析又快又方便

- ▶ 這個實驗的結果確認了負荷增加時NADH的減少和鈣離子的濃度並無明確相關，但是反過來說NADH的恢復就和鈣離子的濃度有關係



授權方式說明

單機版

網路版

單機版 NODE-LOCKED LICENSE

- ✓ 鎖定主機名稱和網卡序號且需要一個獨立序號
- ✓ 啟動第一次時從**Origin**軟體內部輸入產品金鑰即可註冊並會記憶金鑰/如沒有網路連線的環境下，需要稍微辛苦複雜的方式註冊。(可給予協助指導但需自行操作)
- ✓ 您可以主動地移除原來安裝的**Origin**並且安裝於新電腦上，具備維護期間內的單機版提供自行移機功能(**deactivate tool**)。(請注意:要能夠開啟**Origin**軟體)。

網路版授權： NETWORK LICENSE / FLOATING LICENSE

- ✓ 網路版授權方式：選取一台具備固定ip address 的電腦作為server pc 安裝網路管理的工具(FLEXnet licenser server / lmttools)來安裝網路版。(只要作業系統支援)。*會綁定這一台電腦的主機名稱與網卡序號
- ✓ 相對於server pc，眾多的client pc 需安裝origin程式-安裝完成之後啟動需先連線server pc，第一次會輸入server pc 的ip address；此時會計算當下同時跑Origin的人數，此人數受限於您所購買的數目而定。
- ✓ 可以使用借出功能(出差或旅遊時可以作為單機版)，借出最多兩周，並減少原來同時上線人數。
- ✓ 網路版下可以支援Origin以及OriginPro並存，請參考網頁說明
- ✓ 您可以透過options file 來限制使用量以及黑名單等功能。
- ✓ 移轉server pc 需填寫表格請美國原廠處理

支援形式	說明	有軟體維護	無維護
安裝 & 授權	軟體安裝	✓	✓
	網路版需註冊並製作授權檔案	✓	自行操作
	單機版需註冊並取得金鑰	✓	✓
	自動化安裝方式 (MSI Installer , Template Installation)	✓	自行操作
轉換系統／轉換授權	使用軟體選單內建 deactivation/activation 方式 (或是官方網頁方式登入已註冊帳號之下：選定金鑰後方欄位：點選 report a licensed server no longer in use 。	使用軟體選單進行移除作業	使用軟體選單進行移除作業
	當 deactivation 方式無法移除時 (電腦死當／無法進入Origin開啟 help 選單)	✓ 協助填寫移轉表格 System Transfer Form	請查閱移轉授權政策 transfer policy
轉換使用者	轉換使用者到其他組織	請查閱移轉授權政策 transfer policy	請查閱移轉授權政策 transfer policy
產品操作支援	包含資料讀入與整理，圖表和主題範本建立，創造客製化擬合函數，分析模板，自動化分析功能	✓ 主動聯繫或填寫 技術支援表 並免費提供建議或直接協助。(須提供序號與系統資訊較為方便)	可自行操作
	使用程式編譯	填寫 技術支援表 並免費提供建議。(須提供序號與系統資訊較為方便) 或是尋求協助原廠 諮詢	填寫 技術支援表 或是尋求協助原廠 諮詢

軟體維護的好處多！



問題與討論

Thank you for your patience

www.originlab.com.tw



snchang@qi-well.com



0909-579-000

ORIGINLab創辦人楊超平(Jerry yang):
用功，保持一種開闊和靈活的思路。
----USTC 1999



ORIGINLab原廠合格認證
張旭男 *sherman chang*

附錄一

- **ORIGIN**的強大開發能力
- **ORIGIN**與第三方軟體的結合能力

Origin Application

Origin GUI:

Workbooks, Matrices, Graphs,
Graph Templates,
Analysis Templates...

R console
(2016~)

Origin C

LabTalk
Scripting

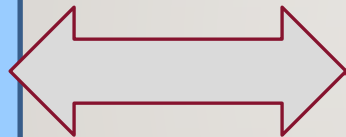
Python
(PyOrigin)

NAG
Numerical
Library

Automation/
COM Interface

Client Applications:

Excel VBA
LabVIEW
MATLAB
Python
Visual C++
Visual Basic
More...



• **Origin C:**

- ANSI C Compatible, with C++, C# Features
- Multi-tabbed Editor with Code Folding, Debugging
- Access to NAG Library, External DLLs
- Save Code with Project or Auto Load

LabTalk:

- Proprietary Scripting Language
- Easy Access to Origin GUI Objects
- Assign Scripts to Buttons, Menus, Events
- Access X-Functions and Origin C Functions

Python (PyOrigin):

- Embedded Python ver 3.3.5 or ver 2.7.8
- PyOrigin Module to Access Origin Objects

NAG Library:

- Complete Library Accessible from Origin C
- Numerical Functions for:
Mathematics, Statistics, Regression,
Time Series, Differential Equations,
LAPACK, BLAS and more...

COM Server:

- Connect to Origin as Server Application
- Send Data and Commands
- Get back Results and Graph Images
- Use Templates for Automation

附錄二

• 「產、學、研」的資源投入比例

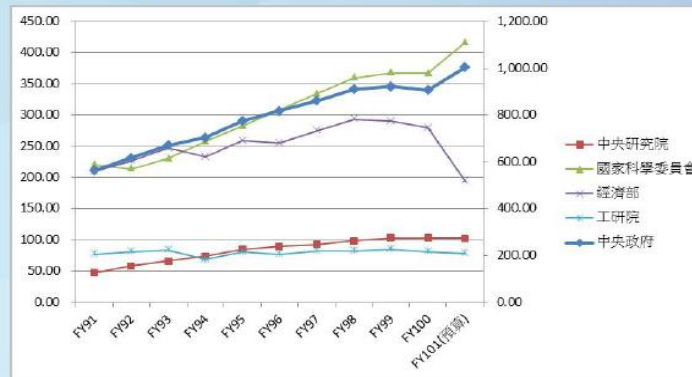
2013年經濟展望論壇



5. 產業研發投入資源不足，學術研究投入資源太多，但產學合作聯繫不佳

表3 歷年中央政府科技經費概況

	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY100
中央政府	563.91	617.1	671.63	704.21	776.04	818.53	861.46	910.3	923.93	907.03
中央研究院	47.28	58.43	65.92	74.02	85.31	89.38	92.93	98.58	103.3	103.03
國科會	220.5	245.11	262.83	301.12	317.09	350.07	358.86	375.85	386.94	400.39
經濟部	209.6	226.85	247.35	233.18	258.83	255.09	275.15	293.64	290.33	279.7
工研院	77.51	81.43	83.85	69.04	80.29	77.04	82.46	82.46	84.79	81.48



附錄三

海盜王時代人人心中都有一個路飛



「如果伸展台上的模特兒是唯一穿得起高級服裝的人，流行業就無法賺錢」

BSA 全球軟體盜版率調查報告報告重點：

2011全球PC軟體盜版率維持在 42% 。

BSA2015最新調查：台灣未經授權軟體使用率仍高達36% (下降趨勢)

全球盜版軟體灰色市場的商業價值自2010年的588億美元攀升至2011年的634 億美元，創下新高，主要原因是在盜版率最高的新興經濟體，PC出貨量仍持續增加。

政大智慧財產研究所所長劉江彬指出，**必須要從大專院校著手建立智慧財產權的觀念**

例如：大學應要求新生入學時，同時簽下禁止使用校園網路進行侵權行為的公約，並把智慧財產權的課程列入中小學的教材中。

附錄三

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BSA 2015全球軟體盜版率調查報告報告重點：

- 亞太區的未經授權軟體使用率為全球之冠，達**61%**，僅較2013年度下降1個百分點。
- 中歐與東歐以**58%**的比率居次，較上一次研究下滑3個百分點；中東與非洲則為**57%**，下降2個百分點。
- ✓ 北美仍然是全球未經授權軟體使用率最低的區域，降至**17%**，但其商業總值仍高達近100億美元，十分驚人。
- ✓ 在西歐地區，未經授權軟體使用率下降1個百分點，為**28%**。

BSA台灣區主席：

每降低**10%**盜版率，增加了近五千個高科技工作機會、本土軟體產業增加**10**億美元的產值與政府**8700**萬美元的稅收

- 「這就代表，每增加**10%**盜版率，就會減少五千多個工作機會，」