RENISHAW
apply innovation™

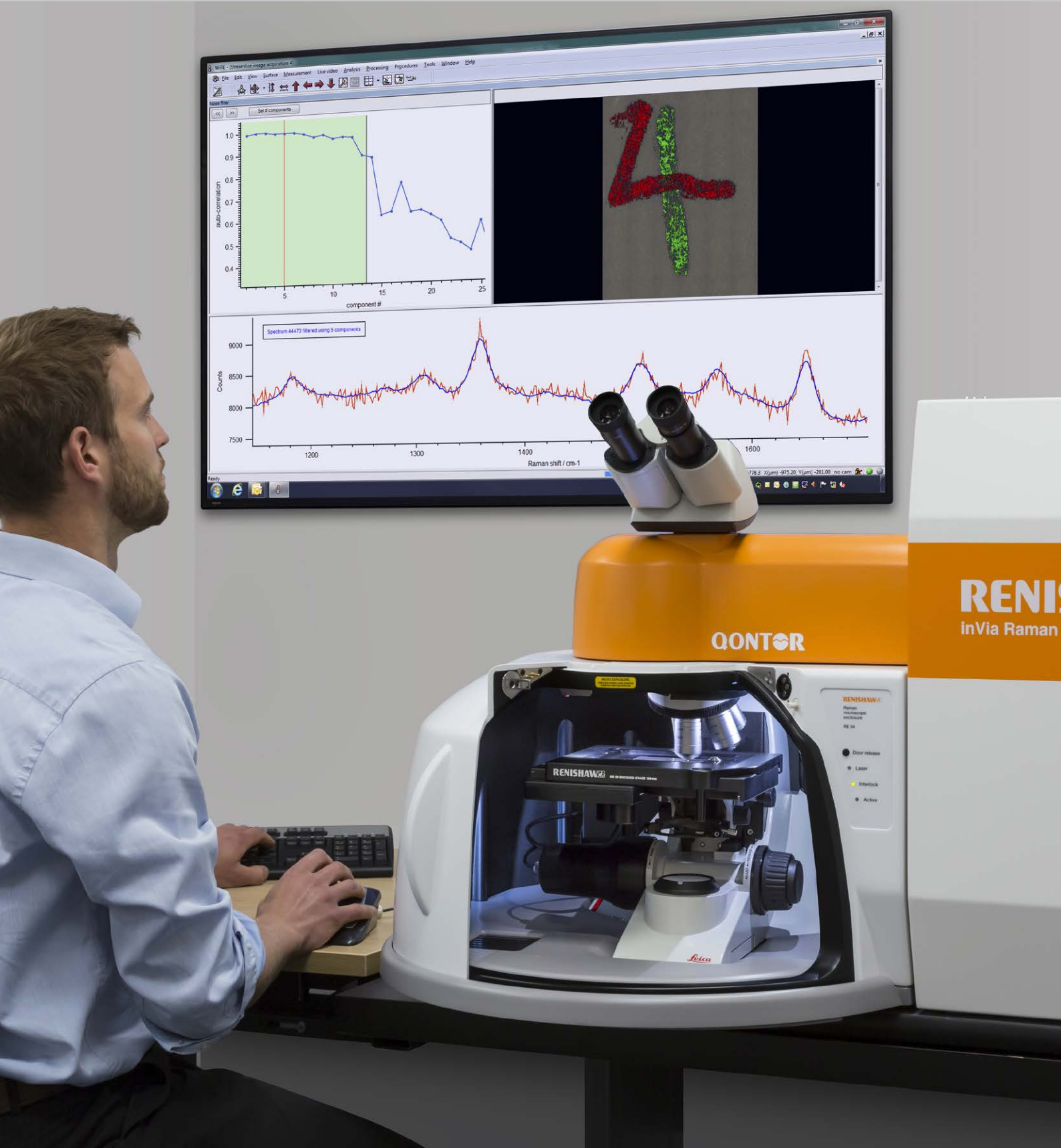# WiRE software

WiRE software

Powerful Raman software

Renishaw's Windows®-based Raman Environment (WiRE™) software is dedicated to Raman spectroscopy and is the power behind Renishaw's Raman spectrometers.

WiRE is the communication interface between you and your Raman instrument. It controls the acquisition of Raman data and provides users with dedicated data processing and analysis options. You can, for example, use WiRE to identify an unknown spectrum, remove its background, or determine the distribution of particles in megapixel-sized Raman images.

Our WiRE software suite has been produced by Renishaw's international team of software experts, guided by our experienced application specialists and users worldwide.

When used within a suitable environment, WiRE complies with 21 CFR Part 11 (the U.S. Food and Drug Administration's part 11 of Title 21 of the Code of Federal Regulations; Electronic Records; Electronic Signatures).

To ensure your experiments are optimized, we have produced a series of WiRE training modules. These give step-by-step instructions and are available for download from our dedicated training modules web page.

You can access this page at **www.renishaw.com/WiRE**
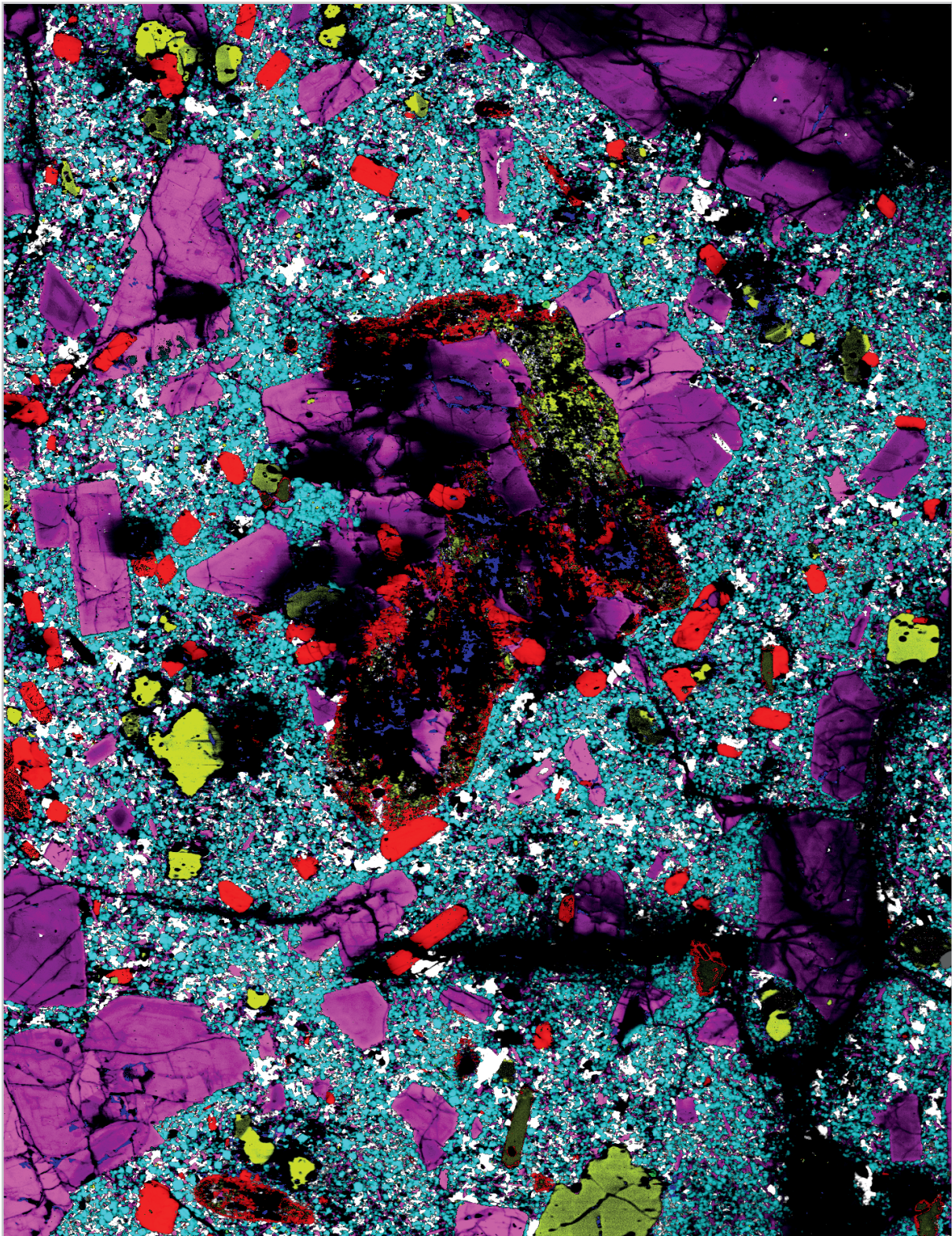
A high definition Raman image of a volcanic rock section from Mount St Helens generated from 2.7 million spectra. The colours indicate the many different minerals present. Rock section courtesy of Dr Claire Horwell and David Damby, University of Durham, UK.

WiRE software

Control your Raman system

Instrument control

Primarily, WiRE is the communication interface between you and your Raman instrument. Quickly and easily configure your experiment, harnessing the high degree of automation of Renishaw's Raman systems.

WiRE:

- automatically references motors during instrument start-up, ensuring they are in the correct place

- moves key optics to their aligned positions when you change instrument configuration. You don't need to manually align components

- synchronises mechanical components and electronics during precision operations (such as SynchroScan spectrum acquisition and StreamLine rapid chemical image generation)

- performs health checking and calibration of the instrument

Sample viewing

WiRE can control video cameras and mapping stages to provide enhanced views of your samples.

- Automatically capture white light images from reflected or transmitted white light. These images can be stored with your spectral data

- Create high resolution white light images over large areas by using WiRE's white light montaging (tiling)

Montage of washing powder

Data collection

Use WiRE to quickly define and optimise key parameters of your data collection. You get your data quickly and save valuable instrument time.

- Choose the laser, grating and detector modes using simple template options

- Easily configure measurements, such as:

  ° multiple discrete sample points (1D multi-file)

  ° linear profiling (1D multi-file: time, temperature, distance, etc)

  ° fast spatial area analysis (2D multi-file)

  ° complete sample volume

- Collect as much or as little data as you need. If you want, you can collect over 50 million spectra in one dataset

- All instrument and measurement parameters are stored with your data; you do not need to take handwritten notes

- Sometimes you don't know the exact measurement conditions to use. Rather than having to manually try them one by one, you can use WiRE's queuing capability. Configure the measurements all at once and then leave WiRE to run them for you

WiRE can also:

- automatically select line focus illumination mode to use a low laser power density and prevent damage to your sample

- choose the laser power level you want with automated and repeatable power control options

- ensure focus is perfect, with a range of focus maintaining options. Use these when studying samples with uneven surfaces or samples shifting out of focus (e.g. when your sample changes phase in a temperature control cell)

Analyse your Raman data

Data processing and analysis

WiRE is a dedicated software package for Raman spectroscopy. It is designed by experienced Raman users. As a result, it has the specific tools you need to get information from Raman data.

- Process your data to get the most accurate and representative information during analysis

- Analyse your Raman data to extract the wealth of information contained within

Key WiRE features

A range of processing options for single spectra and multi-files focused on:

- background fluorescence removal (including patented intelligent fitting baseline subtraction)

- subtraction of spectral features originating from substrates and solvents

- Cosmic ray removal (including automated nearest neighbour options)

- noise removal and reduction (including automated PCA noise removal)

A range of analysis options for single spectra:
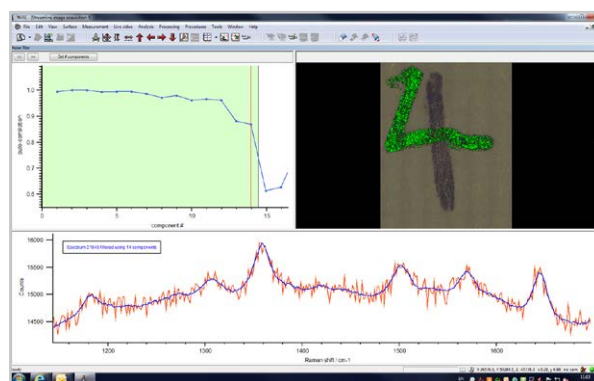
Renishaw WiRE software showing noise filtering

- Spectral identification (choose from an extensive range of databases or build your own)

- Accurate reporting of band parameters (such as position, width and area, to reveal material properties)

A range of univariate and chemometric analysis options for multi-files and Raman images:

- Locate known and unknown species using a choice of supervised and unsupervised analysis options, such as PCA

- Identify unknowns by combining Empty modelling™ and database searching

- Quantify mixture fractions

- Understand the change in material properties through the fitting of accurate theoretical bands (curve fitting) or reference spectra (DCLS)

- Domain size and distribution analysis from Raman images

Getting your data out

WiRE can export results, spectra and images to other applications, for use in reports, scientific papers, etc.

- WiRE's custom labels enable you to select the parameters you want to show on your printouts

- Native resolution image export – don't worry about your screen resolution, you will get crisp clear images

- Export of single and multiple spectra to different spectral formats

- If you need more specialised analysis, WiRE can save its file data in a host of third party formats, including Mathworks® Matlab®* format

- Copy and export of spectra and views as high quality vector format graphics for use in publications

*Mathworks and Matlab are registered trademarks of Mathworks
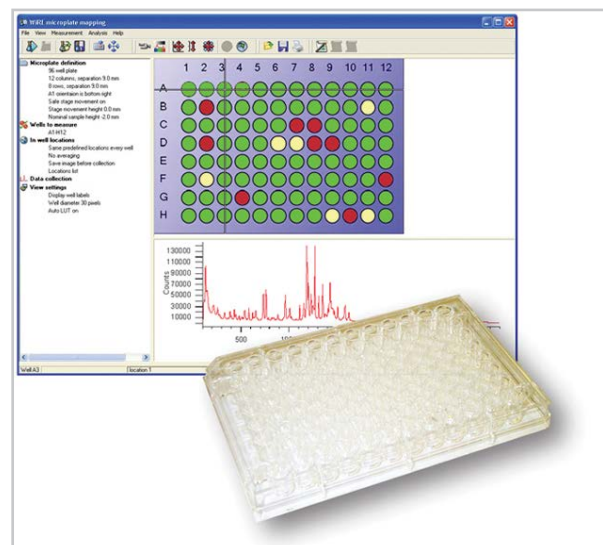
WiRE software

Flexible

The core WiRE software package includes all the features most users need. You can add optional modules which provide extra capabilities or, if necessary, Renishaw can work with you to develop a custom solution.

Additional modules

Customise WiRE by adding modules which contain specialist features:

- micro plate mapping - for pharmaceutical and biological research

- Custom Analysis Package (CAP) module - for process monitoring, QA and QC

- dedicated SEM-SCA controller - for combined SEM-Raman systems

- Raman particle analysis - flexible approach to locating, analysing and automating measurements on multiple particles

- batch converter - convert data between file formats

- temperature cell controller - advanced and interruptible control of temperature ramps for temperature cells

- Multi-file builder - for combining similar individual spectra into one combined file for easy subsequent analysis

Microplate and WiRE screenshot

Custom software for your experiment

We pride ourselves on our ability to provide you with bespoke solutions, if required. We can do this because our Raman systems are flexible and fully automated. WiRE software plays a key role in supplying a complete solution. It ensures custom hardware changes are fully integrated and easy to use.

Renishaw's key technologies

Since its establishment in 1973, Renishaw has been strongly committed to research and development. With numerous awards throughout its product lines, it is recognised as a world leader in devising novel mechanical, electronic, and optical technologies.

Renishaw's spectroscopy products reflect this with innovations in Raman spectroscopy. The following core technologies are widely used in our products.

LiveTrack™: optimum focus is maintained automatically

SynchroScan™: coverage over extended spectral range

StreamLine™: generate chemical images rapidly

StreamLine™ Slalom: analyse the whole surface

StreamHR™: generate high resolution chemical images

True Raman imaging: rapid snapshots of large areas

High definition Raman images: collect and analyse large datasets

EasyConfocal™: detailed 3D images

Surface: collect Raman data over uneven surfaces

FocusTrack™: maintain focus during measurements

Cosmic ray remover

Automatic intelligent background removal

Empty modelling™

High speed encoded stage (HSES)

Full automation

Kinematic mounts

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About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

For worldwide contact details, visit www.renishaw.com/contact

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