Applied NanoFluorescence

NS1, NS2, NS3, and NS MiniTracer Line of NanoSpectralyzers

Training PowerPoint
Applied NanoFluorescence, LLC
2018

for informational purposes only

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What are NanoSpectralyzers?

Versatile multi-mode spectrometers optimized for nanomaterial characterization designed by experts in nanotechnology for scientific research.

NS1

NS2

NS3

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What makes it unique?

Able to measure a large variety of nanomaterials through their optical properties

Specializes in near-infrared (NIR) fluorescence spectroscopy

Custom software created to analyze single-walled carbon nanotubes and deduce a samples diameter and (*n*,*m*) distribution

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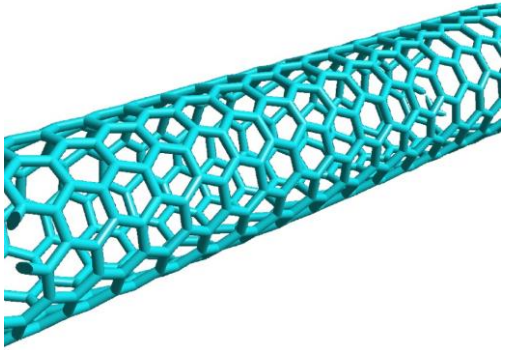
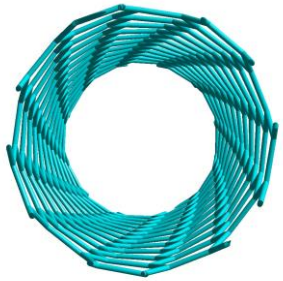
What types of nanomaterials?

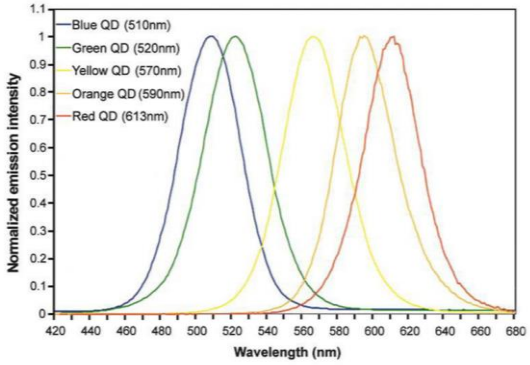
Metallic nanoparticles:
gold, silver, spheres, or rods

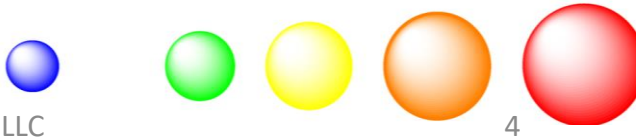
Carbon nanoparticles:
carbon nanotubes, graphene,





Quantum dots:
CdSe, PbS, etc





What spectroscopy modules are available?

Fluorescence:

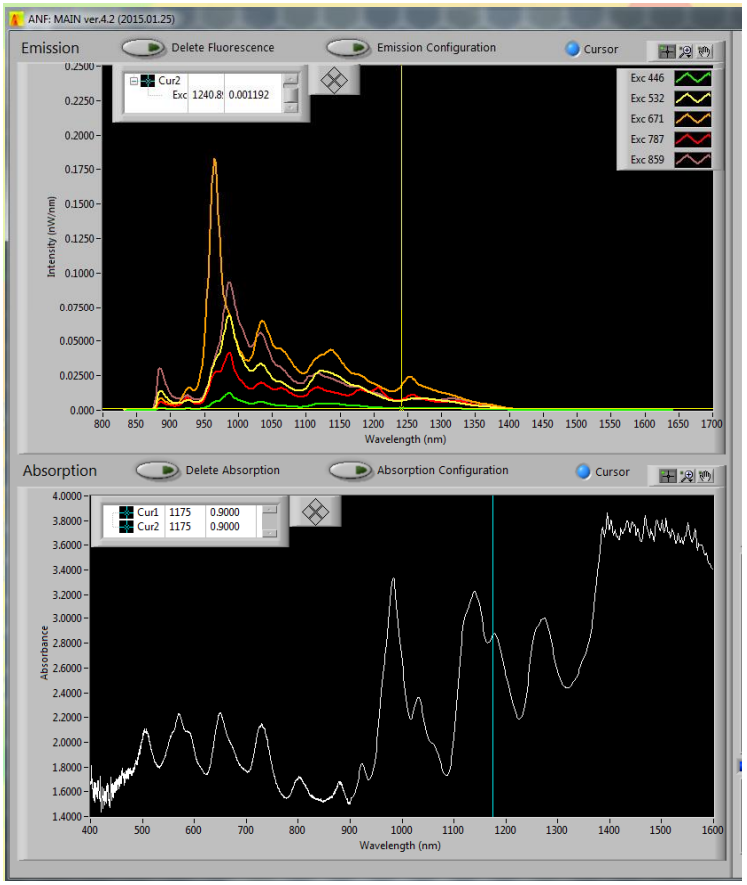
Visible (450-900 nm)
Near-Infrared (900-1600 nm)
Extended Near-Infrared (1600-1900 nm)
with up to 5 lasers for excitation

Absorption

Ultraviolet (210-400 nm)
Visible (400-900 nm)
Near-Infrared (900-1600 nm)
Extended Near-Infrared (1600-1900 nm)

Raman:

532 nm excitation (150-3000 cm^{-1})
671 nm excitation (150-3000 cm^{-1})
optimized for carbon nanomaterials



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NanoSpectralyzers: Model Overview

NS1 NanoSpectralyzer

includes 4 excitation lasers; 900-1600 nm range for fluorescence; 410-1600 nm range for absorption

NS2 NanoSpectralyzer

includes all functions of NS1 plus Raman spectroscopy with choice of 532 nm or 671 nm excitation

NS3 NanoSpectralyzer

modular, customizable multi-mode system with 5 lasers for versatile nanomaterial characterization

NS MiniTracer (New!)

includes 1 excitation laser; 900-1600 nm range for fluorescence; optional NIR absorption

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NanoSpectralyzers: Customization Options

	NS1	NS2	NS3
NIR emission and absorption	✓	✓	✓
Visible absorption	✓	✓	✓
Raman (1 excitation wavelength)		✓	○
Raman (2 excitation wavelengths)			○
Visible emission			○
Extended NIR emission/absorption			○
UV absorption			○
External signal input port			○
Laser output port			○
Vertical sample scanning	○	○	○
Reduced sample volume	○	○	○

○ = Optional

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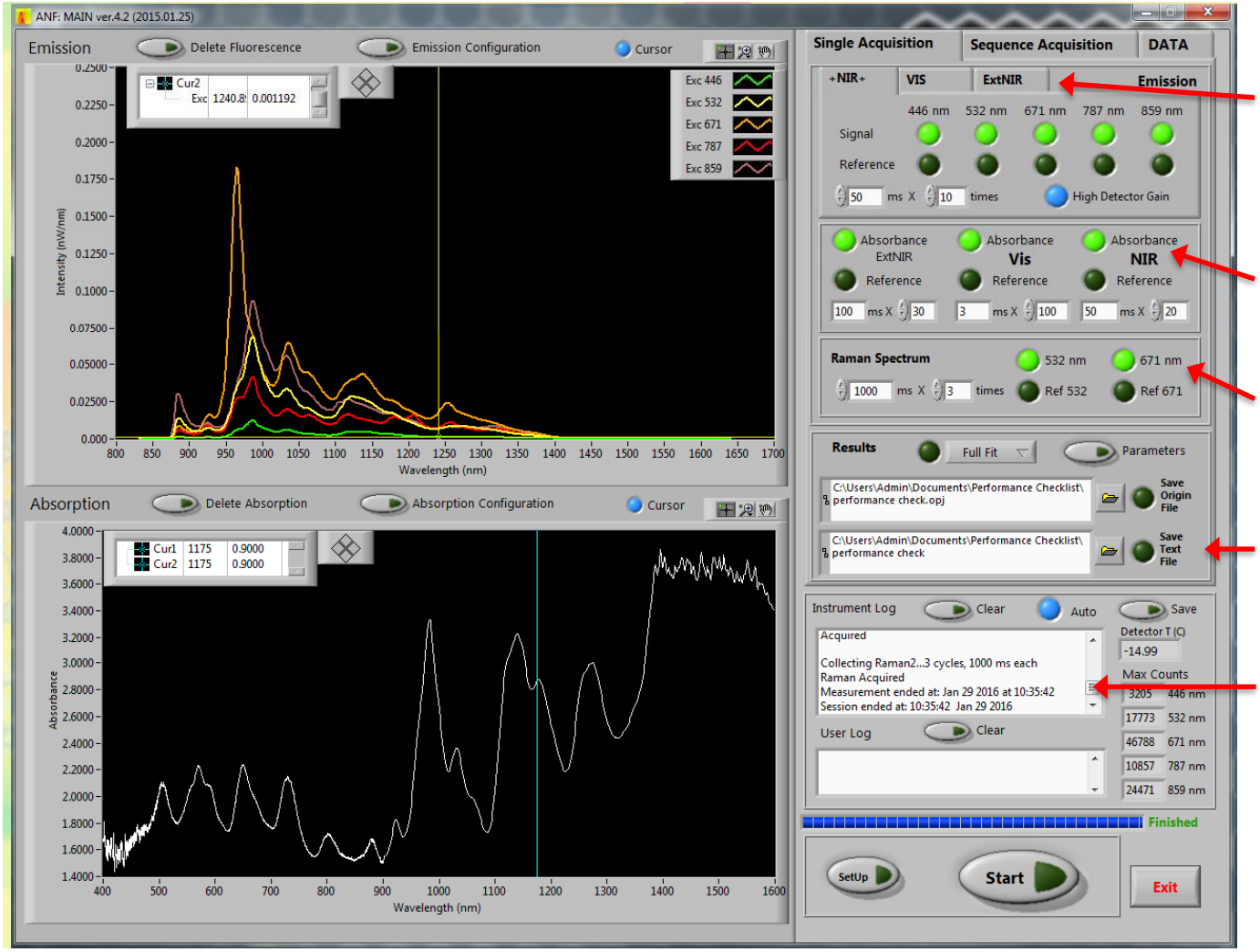
Nanomaterials Characterized by NanoSpectralyzer Model

	NS1	NS2	NS3 with Raman, UV absorption, visible absorption, and visible fluorescence options
SWCNTs	✓	✓	✓
Other CNTs		✓	✓
Gold Nanoparticles	✓	✓	✓
Graphene		✓	✓
Quantum Dots			✓
General Spectroscopy			✓

Control Interface: Overview



Main control screen

Separate control tab for each fluorescence module

Absorption modules control

Raman modules control

File saving options

Instrument log with all acquisition parameters

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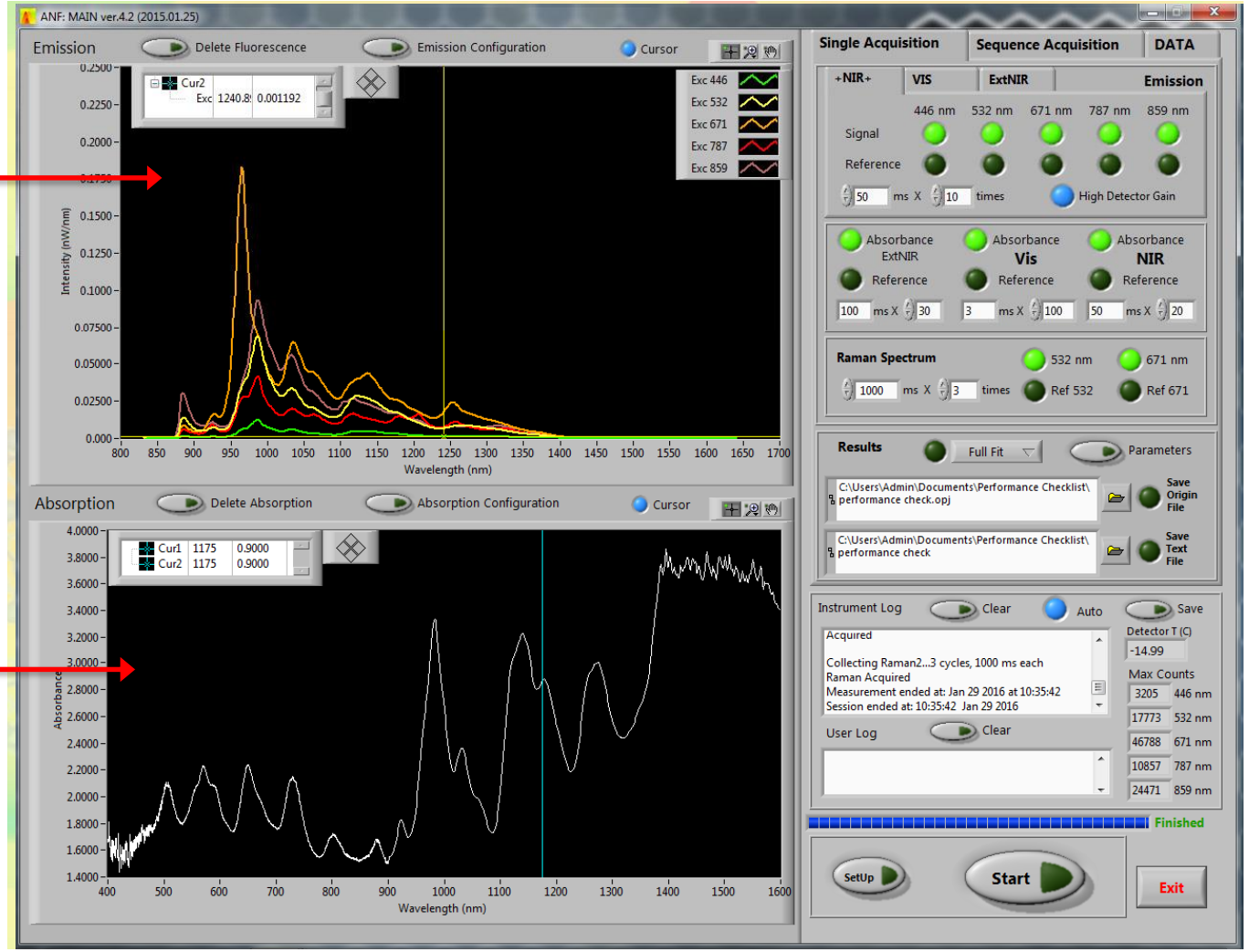
Control Interface: Overview

Main control screen

Graphical output of NIR fluorescence data

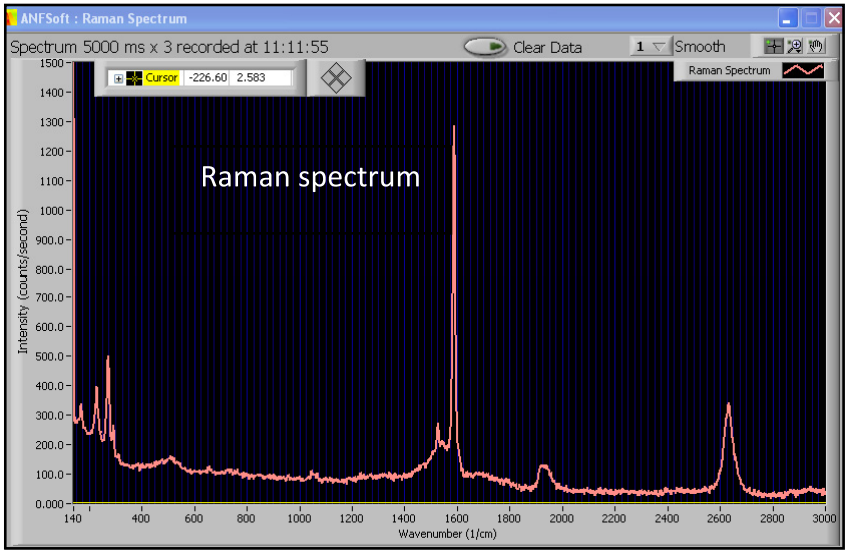
Graphical output of NIR and visible absorption data

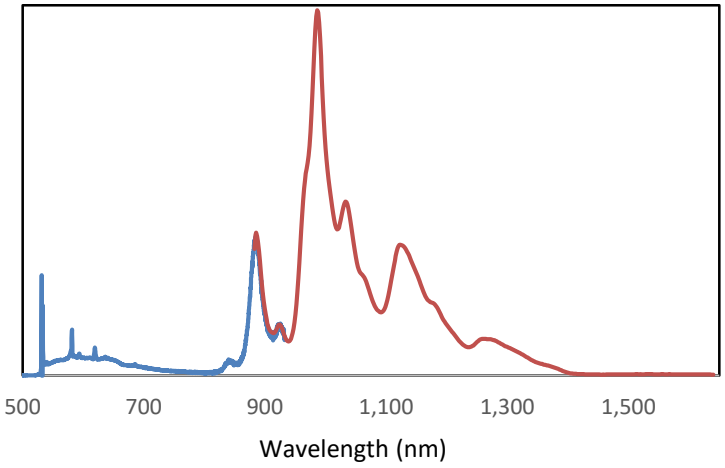


Control Interface: Raman and Visible Fluorescence

Raman and Visible fluorescence results display in separate floating windows

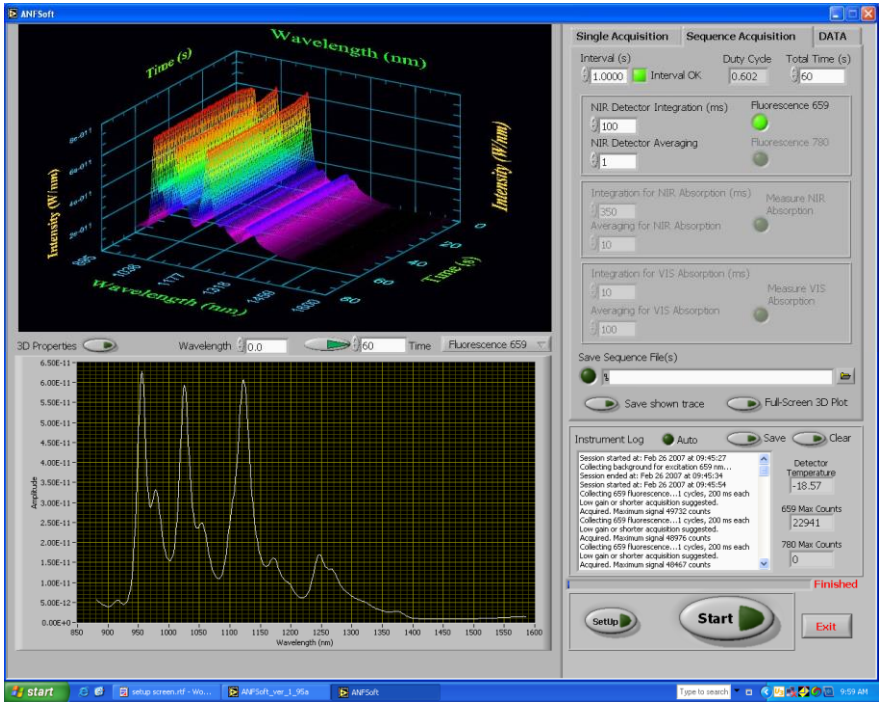
Graphical output of Raman data





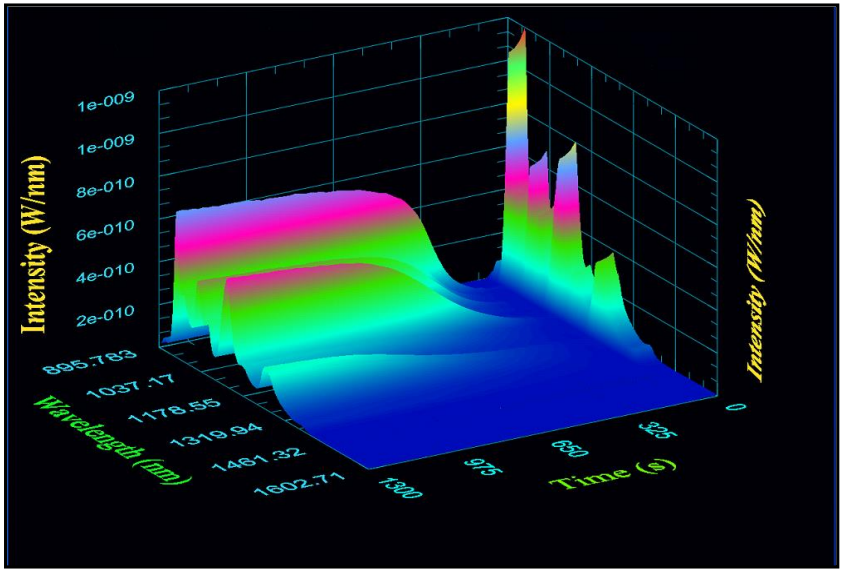
Graphical output of visible emission data (blue) overlaid with NIR emission spectra (red) with 532 nm excitation

Control Interface: Sequence Acquisition



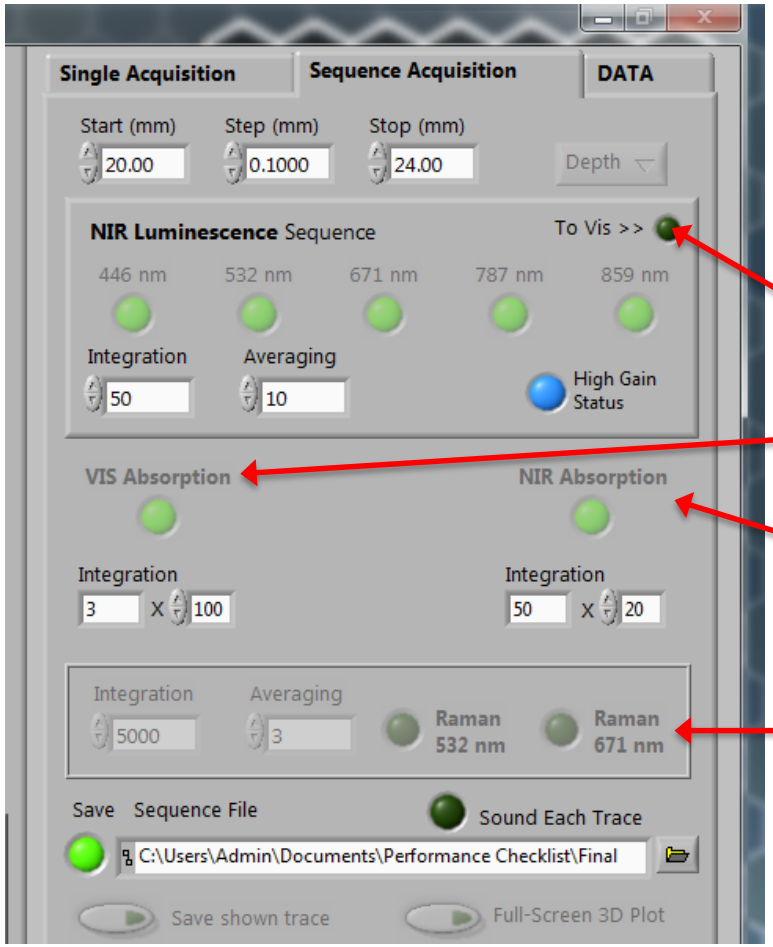
Sequence acquisition tab located on main control screen

Versatile time settings allow measurements of rapid or slow kinetic processes (from 10 spectra per second to obtaining a single spectra every 15 minutes over a day or longer)



Powerful 3D interactive graphical output of sequence data

Control Interface: Sequence Acquisition



Sequence acquisition is available for any spectroscopy module included in the system not just NIR Fluorescence:

Visible Fluorescence

Visible Absorption

NIR Absorption

Raman

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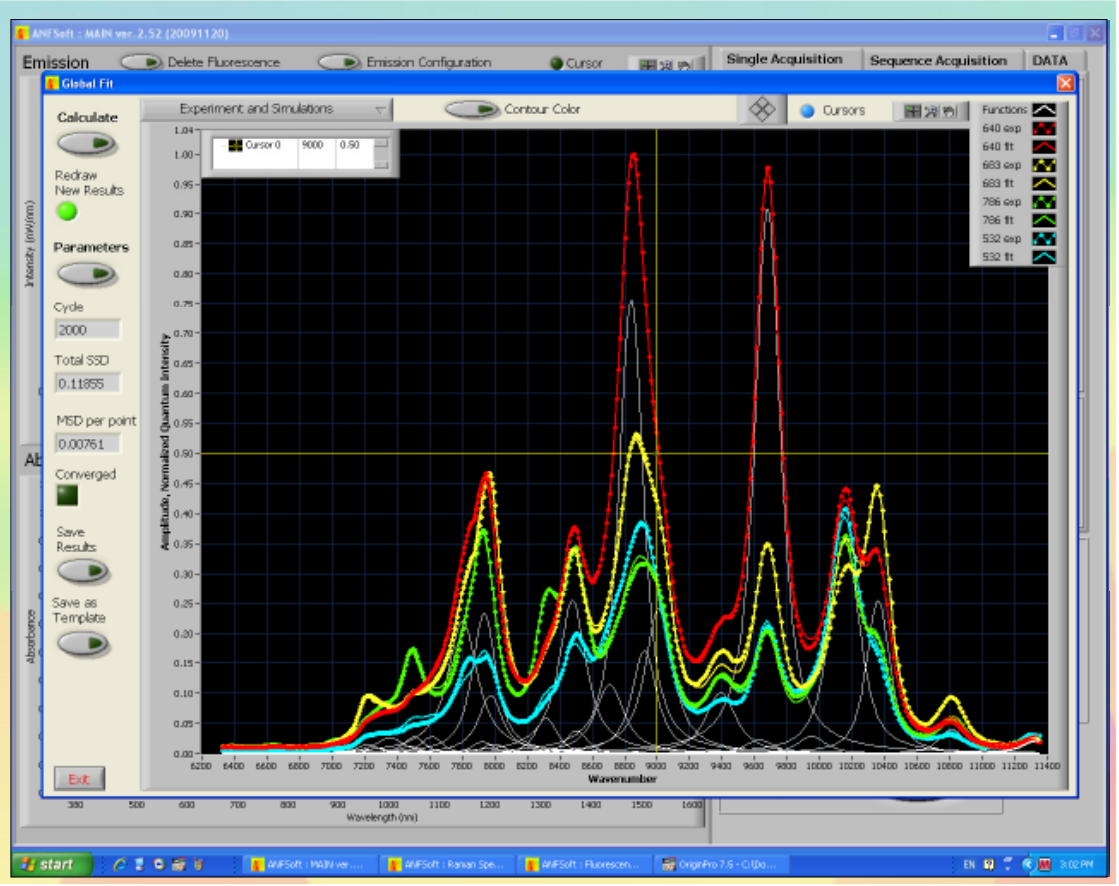
Specialty Analysis Software for Single-Walled Carbon Nanotubes



NIR emission data is spectrally fit dozens of semiconducting (*n*,*m*) species using the very latest in scientific research results

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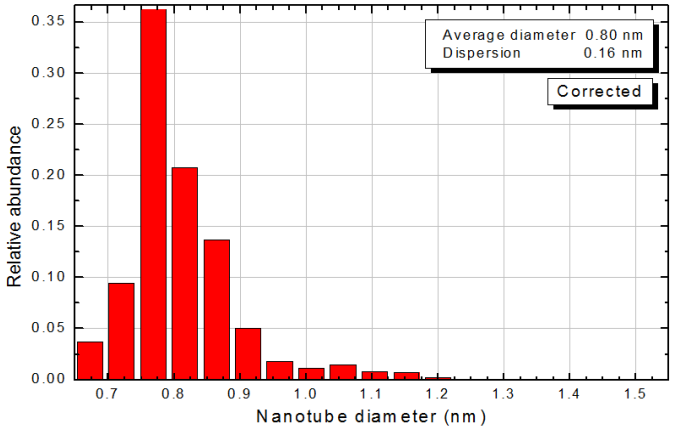
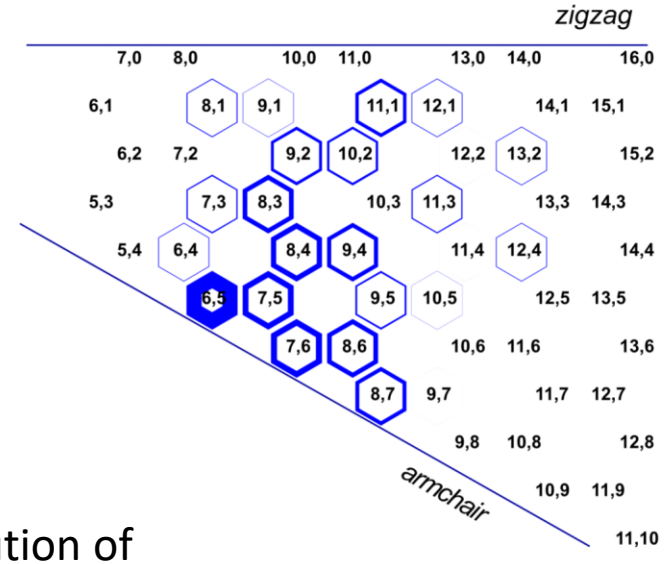
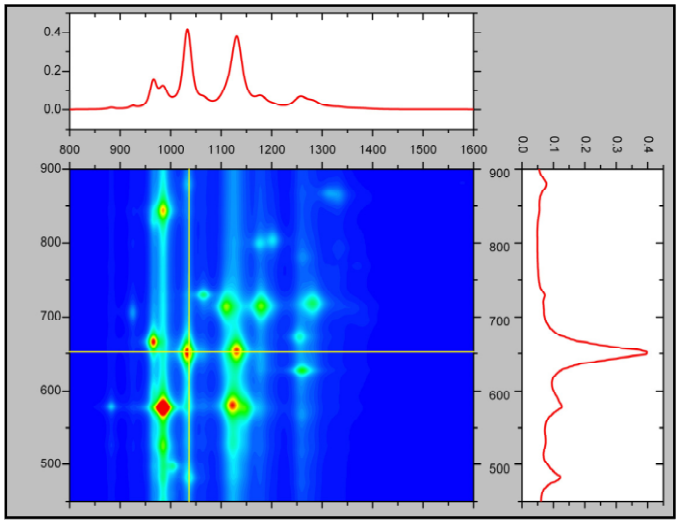
Specialty Analysis Software for Single-Walled Carbon Nanotubes







The distribution of semiconducting (*n*,*m*) species is deduced from the 4 to 5 excitation wavelengths and results displayed in publication ready graphs

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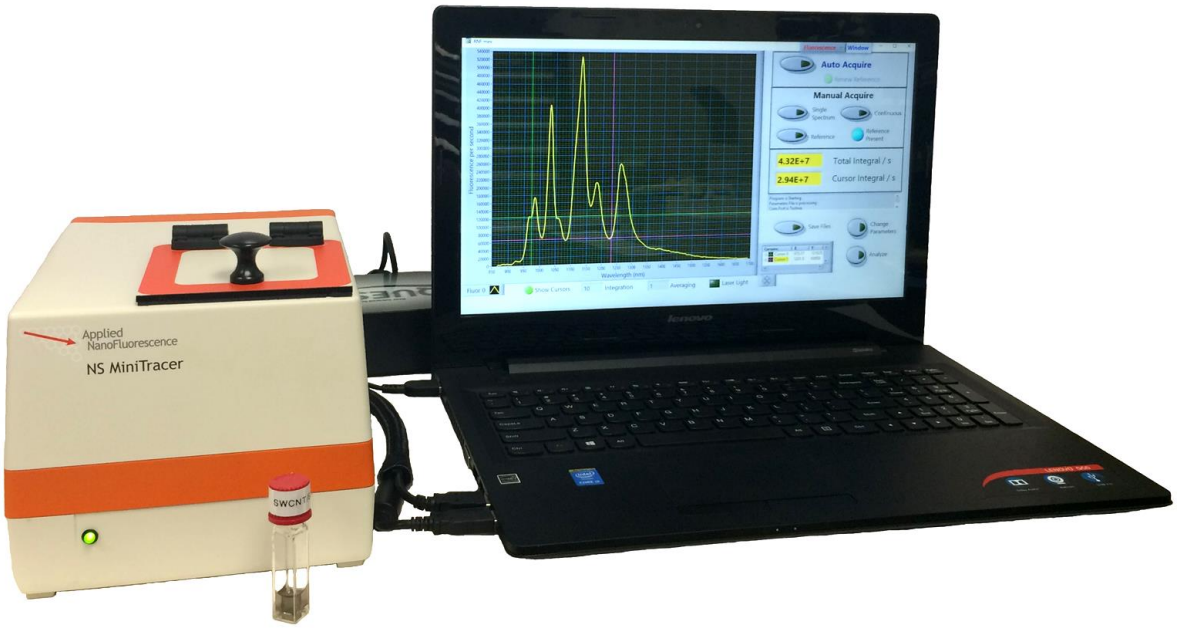
NS MiniTracer

The newest near-infrared (NIR) fluorescence spectrometer from Applied NanoFluorescence



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NS MiniTracer

The newest near-infrared fluorescence spectrometer from Applied NanoFluorescence

Advantages:

- Most affordable fluorometer for single-walled carbon nanotubes
- Quick measurements with user-friendly software
- Trace detection down to sub-nanogram levels; lowest LOD and LOQ available from Applied NanoFluorescence
- Optimized fluorescence measurements in the near-infrared biological window
- Wide dynamic range
- Robust and compact design: approximately 165 x 215 mm (~6.5 x 8.5”)

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NS MiniTracer

The newest near-infrared fluorescence spectrometer from Applied NanoFluorescence

Features:

- Near-IR emission spectra from 900 to 1600 nm
- Rapid sequence acquisition for kinetic studies or eluent monitoring
- Calibration function to easily compute sample concentrations from known standards
- Choice of one excitation wavelength (638 nm is standard)
- Notebook computer with integrated software for system control and data analysis
- One year warranty and free software updates for three years
- In depth technical support from nanomaterial characterization scientists
- Optional near-IR absorption spectra from 900 to 1600 nm

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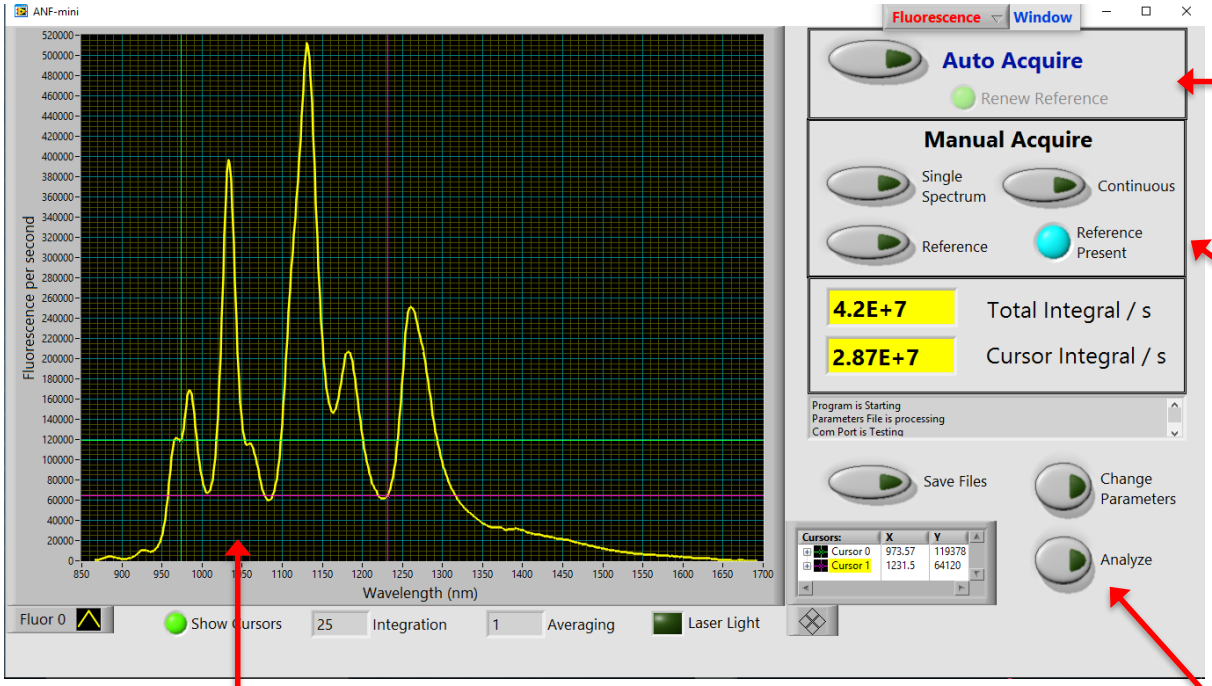
NS MiniTracer

Simplified software for system control and data analysis



Auto Acquire function determines optimum integration time for samples

Manual Acquire function for user defined integration time and averaging

Graphical output of NIR fluorescence data

Analyze function calculates sample concentration based on user's previously measured standards

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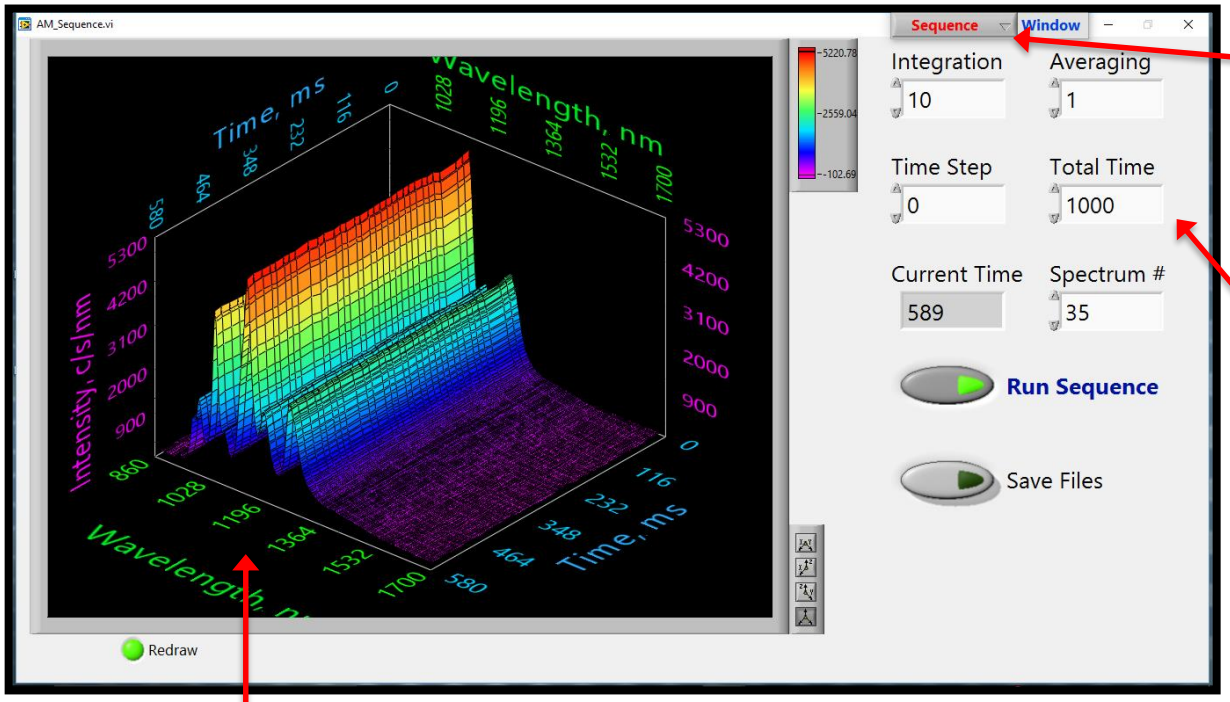
NS MiniTracer

Simplified software for system control and data analysis



Sequence function allows capture of changes in sample fluorescence over time

Versatile time settings allow measurements of rapid or slow kinetic processes (starting from 10 spectra per second)

3D presentation of NIR fluorescence sequence data

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