NIREOS

MEMBER of EPIC

HERA IPERSPETTRALE

A New Hera in Hyperspectral Imaging

VIS-NIR	SWIR	Ext-SWIR
400-1000 nm	900-1700 nm	900-2300 nm

NIREOS | Fast Facts

spin off® POLITECNICO DI MILANO

PoliHub Innovation Park Startup Accelerator

Horizon 2020 European Union Funding for Research & Innovation

- Novel Devices for Spectroscopy
- Spin-off of Politecnico di Milano University
- Founded in May 2018
- 10 people employed
- > 60 years cumulative expertise in photonics
- Scientific, Research & Industrial Market

NIREOS | Products Portfolio

HERA

Hyperspectral Camera

GEMINI

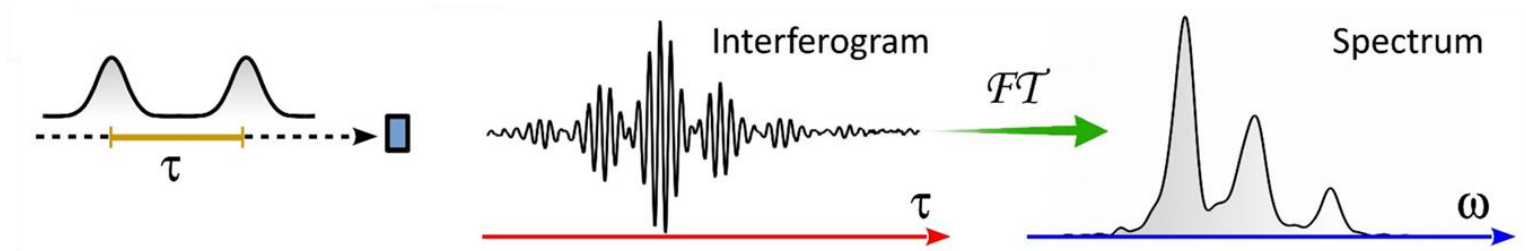
Common-Path Interferometer

GEMINI-2D

Common-Path Interferometer,
(advanced version of GEMINI)

Measurement Principle – Fourier Transform

FTIR spectrometer
(single pixel detector)



Measurement Principle – Fourier Transform

FTIR spectrometer
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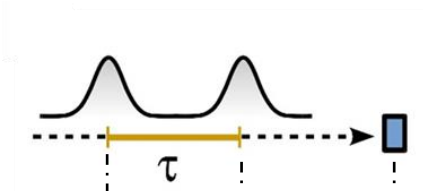
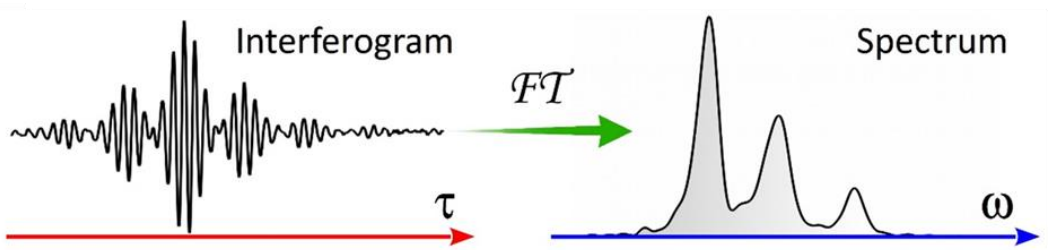
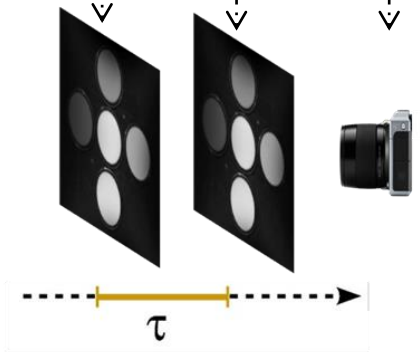
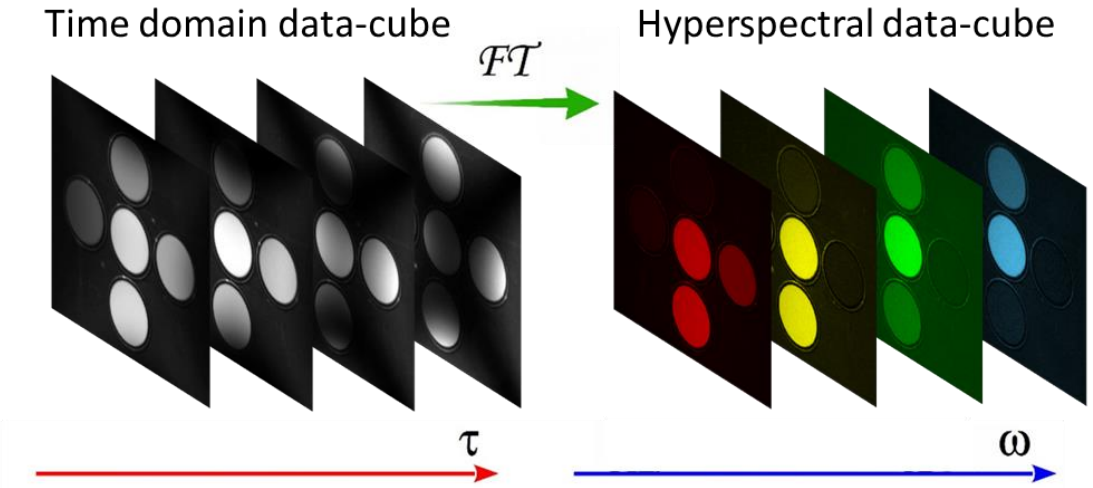


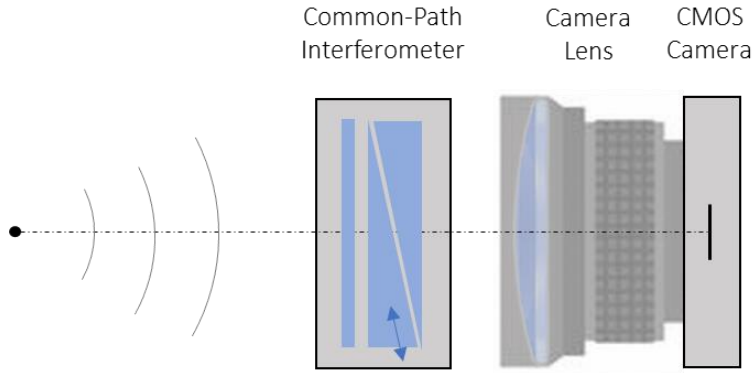


FTIR Hyperspectral camera
(2D detector)





Schematic and Advantages



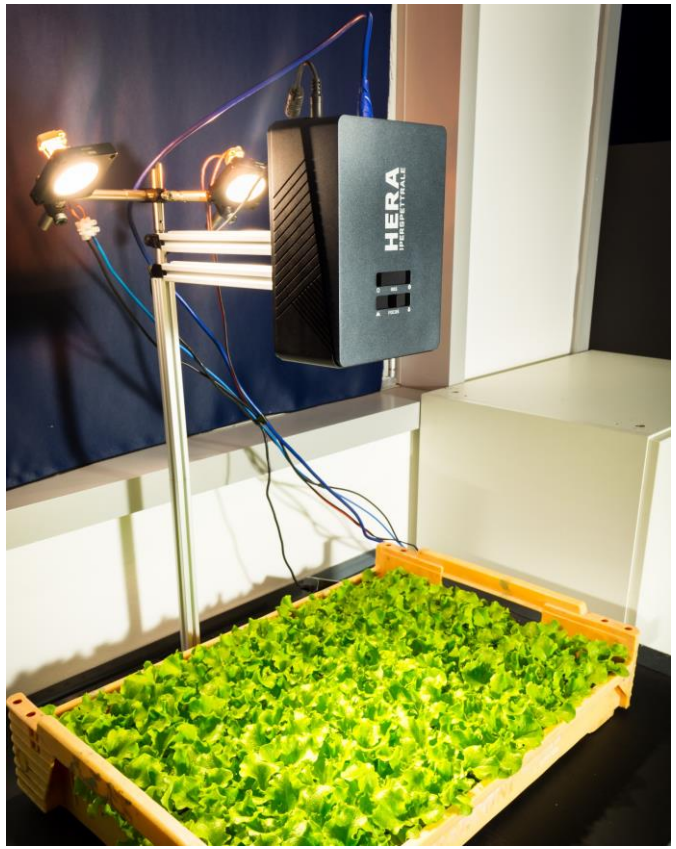
- **Staring technique** → Suitable for static objects, (no need to move the camera or the sample)
- **High throughput & High sensitivity** (thanks to the absence of slit & gratings)
- **Variable Spectral Resolution** (via Software)


MER.A
Full length video available on our Youtube Channel

Case Study – Hyperspectral Imaging in Vertical Farming

AGRICOLA MODERNA

Reflectance spectra
at different days after harvesting

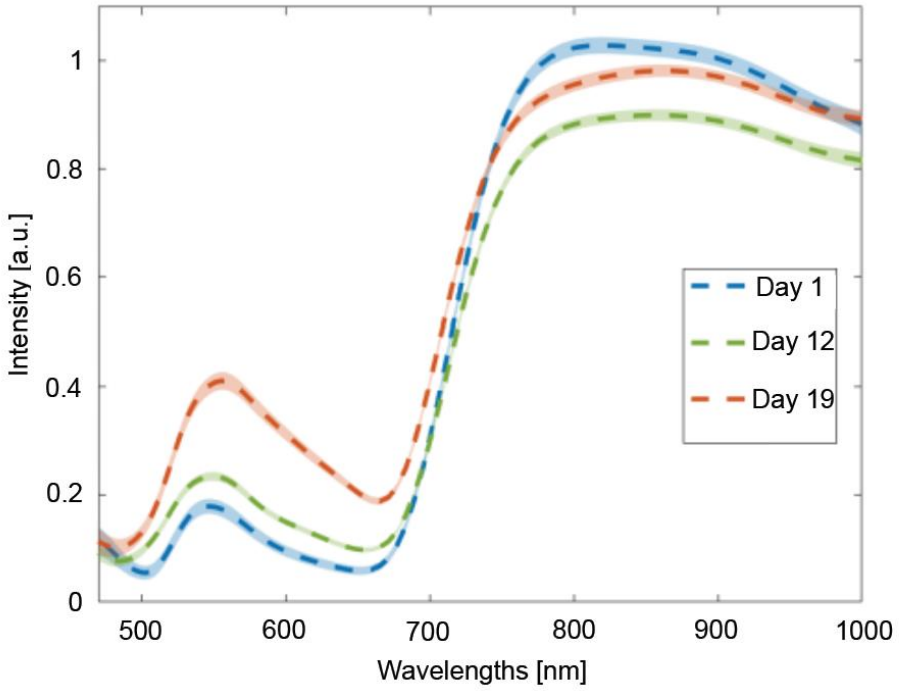


Fluorescence spectra
at different days after harvesting

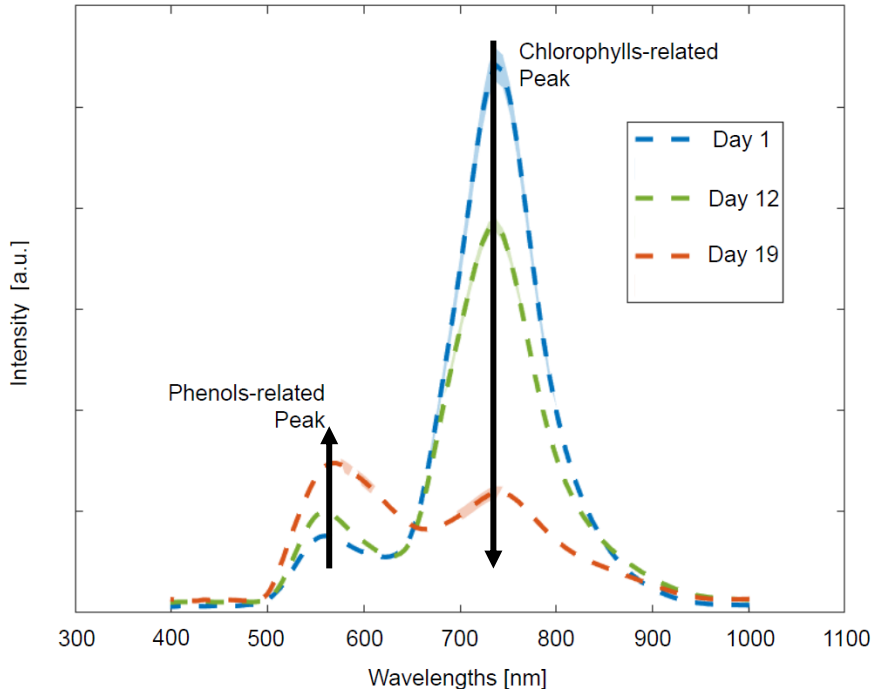
Case Study – Hyperspectral Imaging in Vertical Farming

AGRICOLA MODERNA

Reflectance spectra
at different days after harvesting



Fluorescence spectra
at different days after harvesting



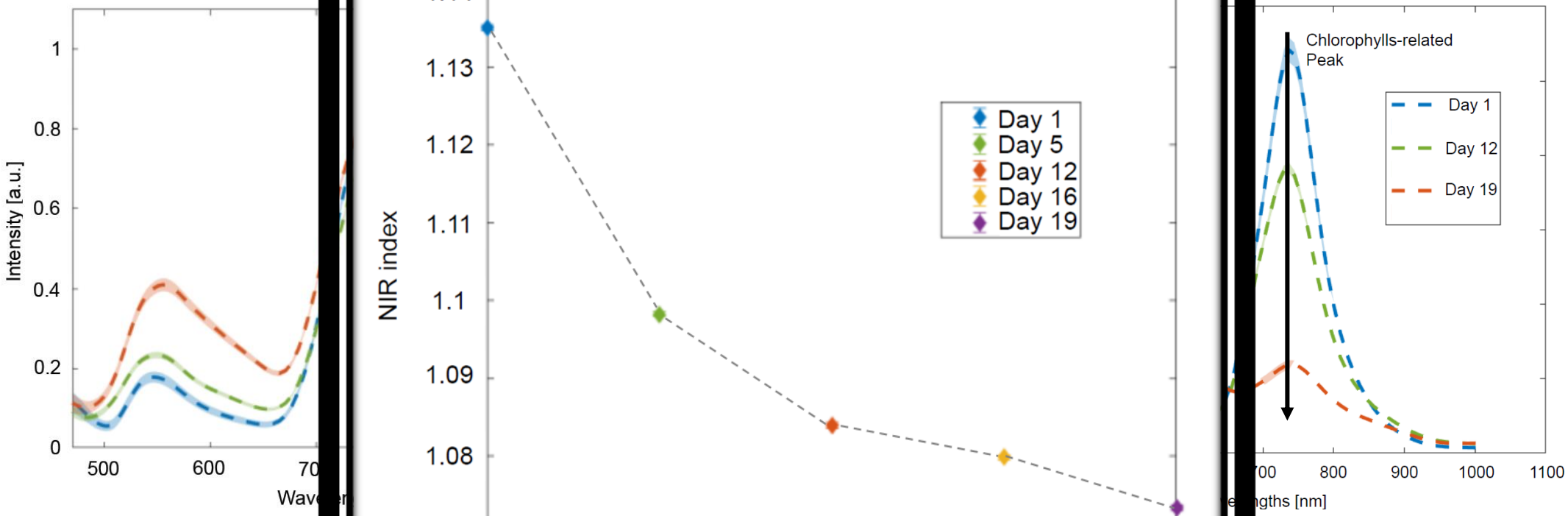
Case Study – Hyperspectral Imaging in Vertical Farming

AGRICOLA MODERNA

Reflecta **nce spectra**

at different day after harvesting

$$NIR_{index} = \frac{\rho_{[825-875nm]}}{\rho_{[960-1000nm]}}$$

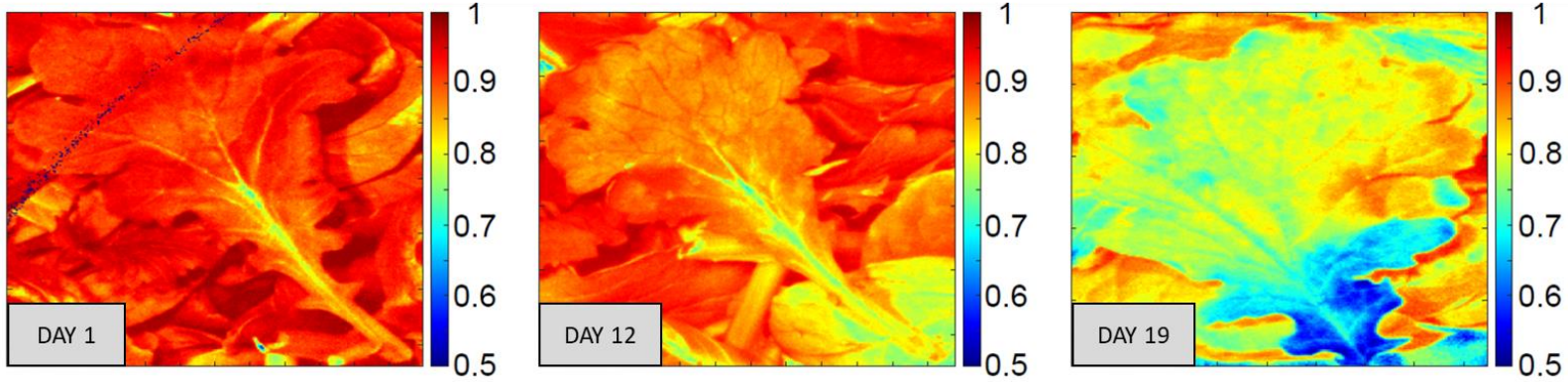


Case Study – Hyperspectral Imaging in Vertical Farming

AGRICOLA MODERNA

RGB Projection

Chlorophyll Index



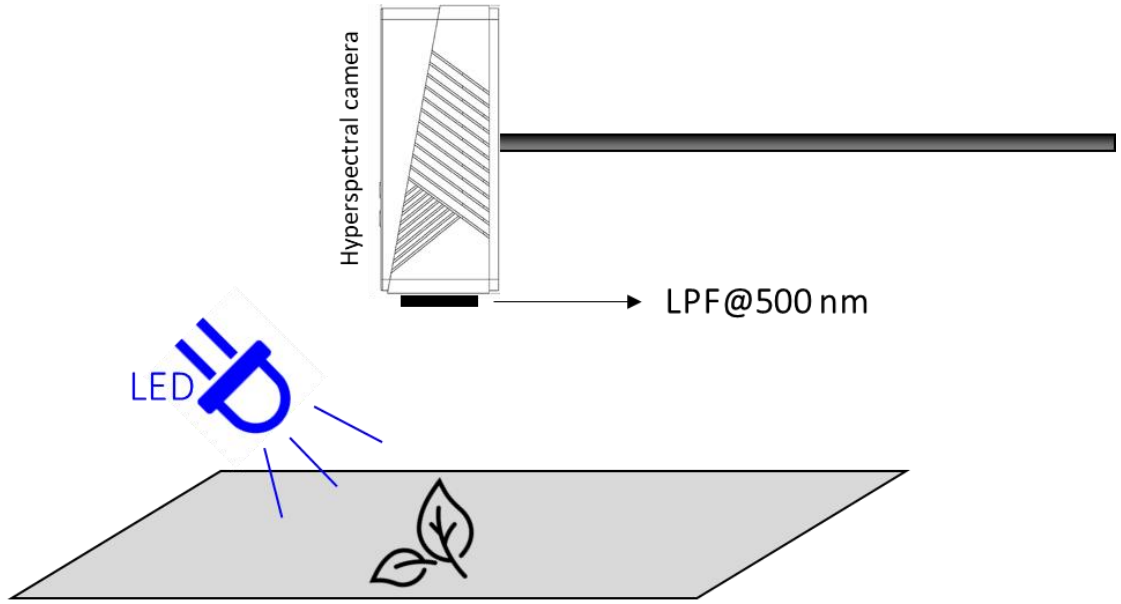
Full Application note available on our website

Q&A Session

E-mail: info@nireos.com

Website: www.nireos.com

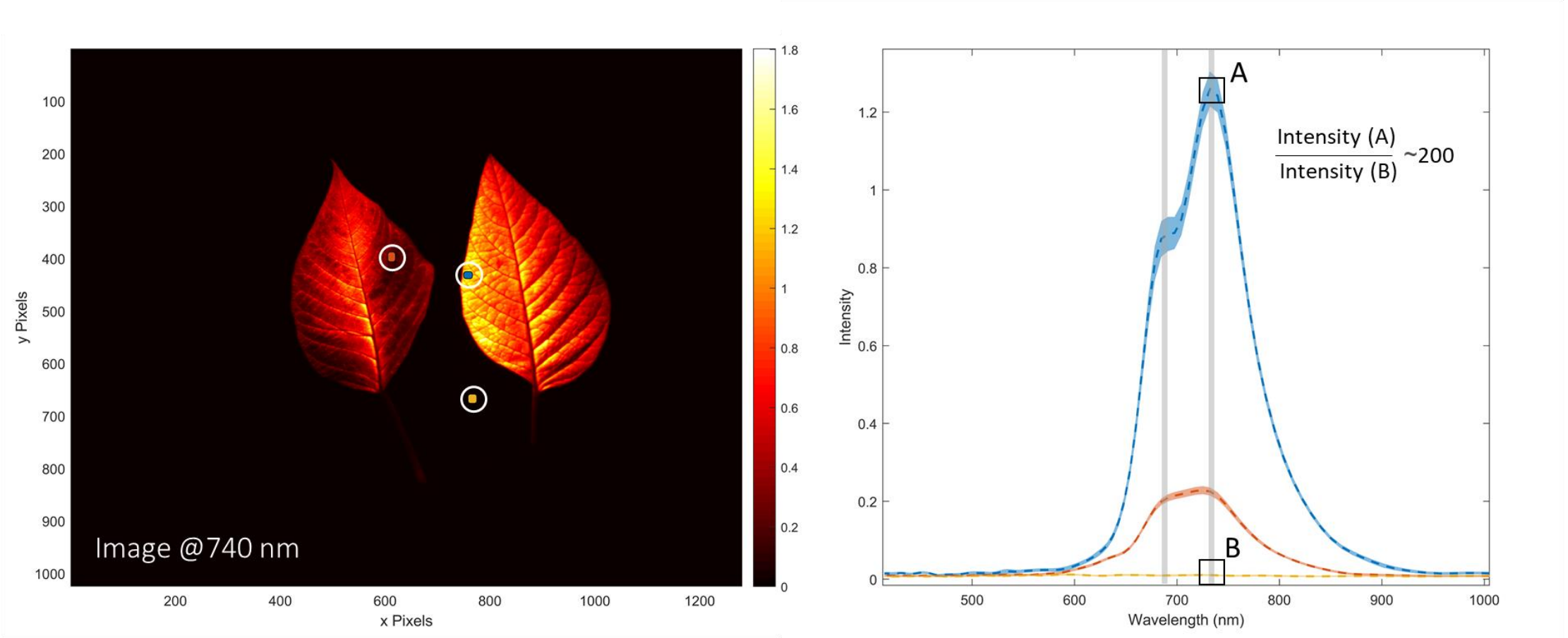
Fluorescence Hyperspectral Imaging



- **Sample:** Two different leaves of Poinsettia Plant
- **Illumination:** LED @400 nm, 2W
- Long-Pass filter (LPF) @500 nm in detection
- 50 seconds measurement time

Fluorescence Hyperspectral Imaging

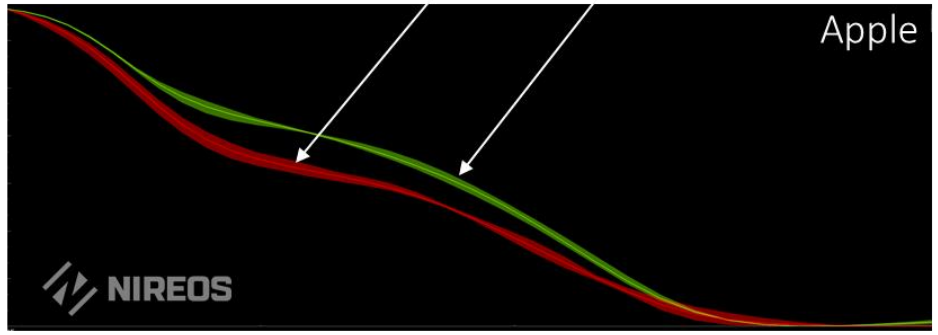
PARAMETERS Excitation: LED @400 nm, 2 W | Measurement Time: 50 seconds | Spatial Resolution: 1.3 Mpixel | Objective: 25 mm focal length - F1.8



Hyperspectral Imaging in the SWIR

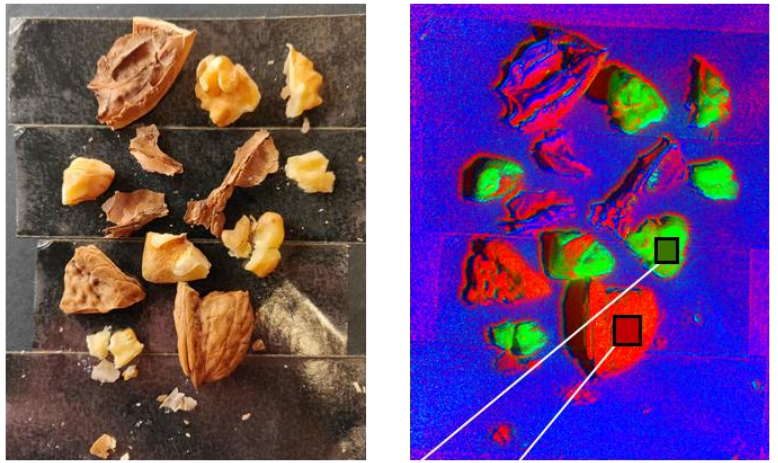
PARAMETERS *(both measurements)* Illumination: Halogen Lamp, 100 W | Measurement Time: 30 seconds | Spatial Resolution: 1 Mpixel

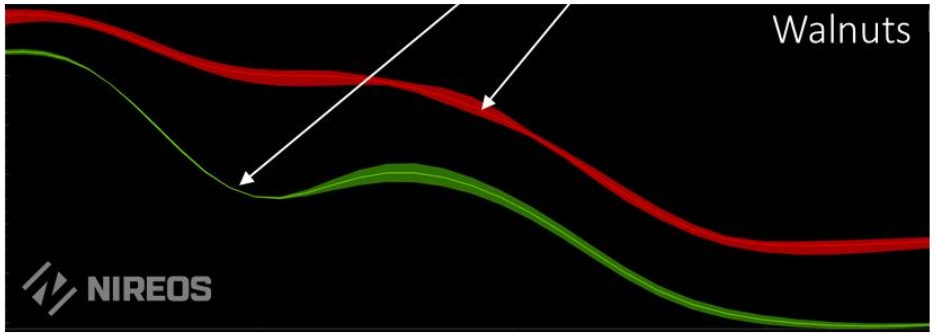
RGB image *Clustered image*



1000 1200 1300 1400 1500
Wavelength (nm)

RGB image *Clustered image*





1000 1200 1300 1400 1500
Wavelength (nm)