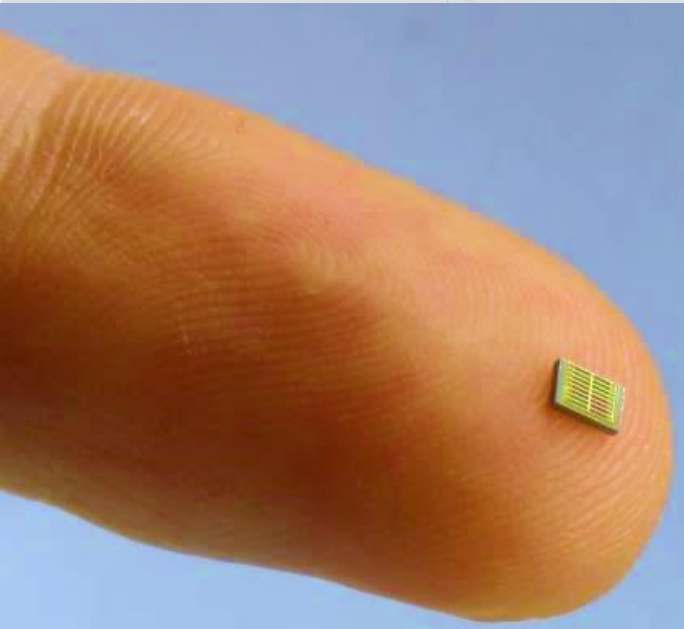


The Spectral Revolution

MantiSpectra

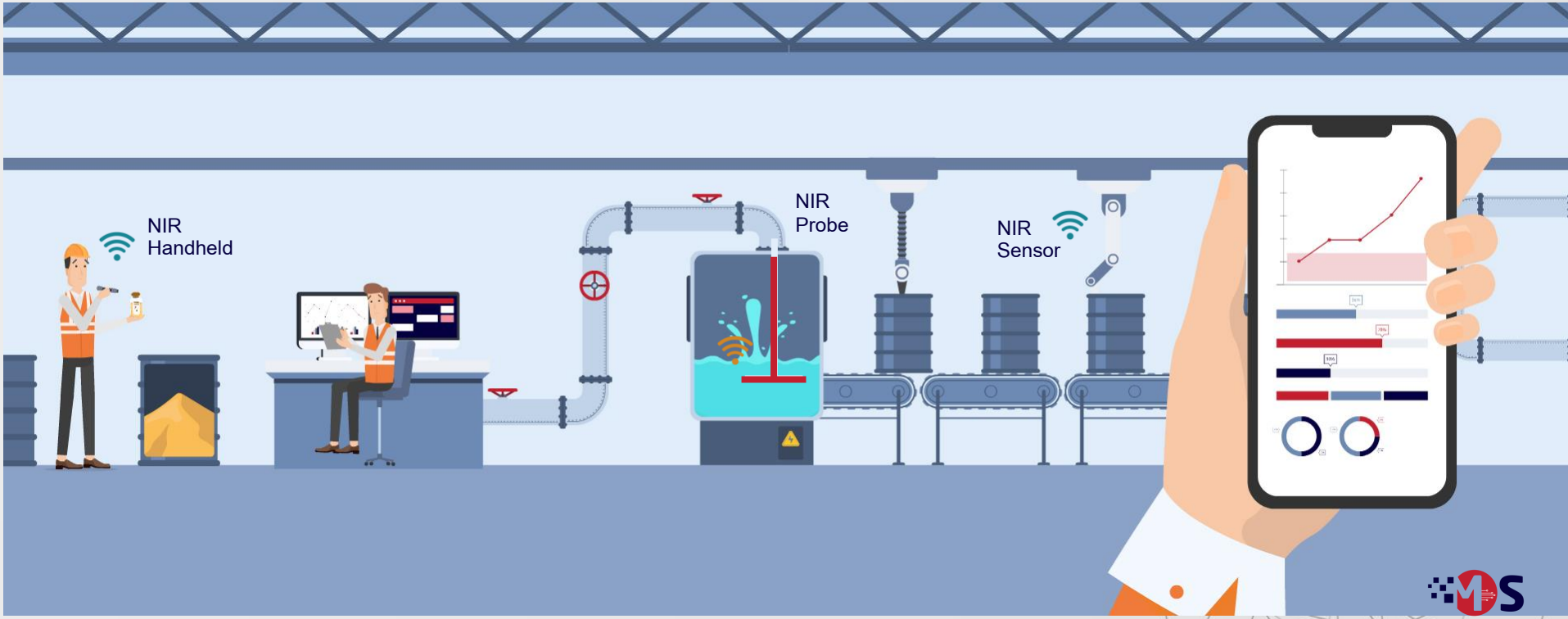
A spin-off of TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Problem: In production, sending samples to the Lab is Time-consuming and Expensive

Need for Quality Control: Real-time, Accurate, Non-invasive, at Multiple points, Cost-effective

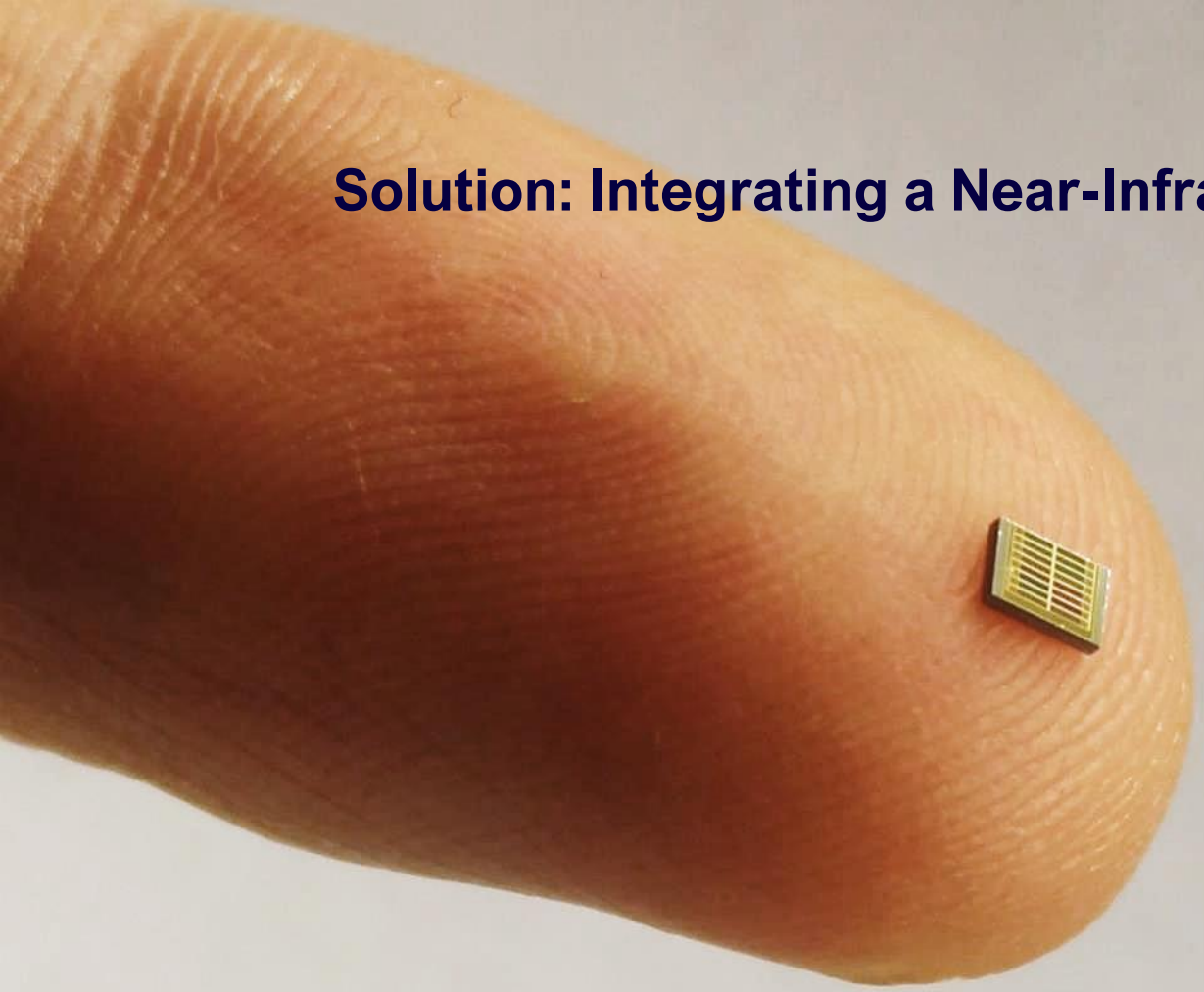
MantiSpectra

Solution: Near-Infrared Sensors to provide Real-time data and close the loop in process control, to **Measure** and take immediate **Actions**



MantiSpectra

Solution: Integrating a Near-Infrared Lab on-a-chip

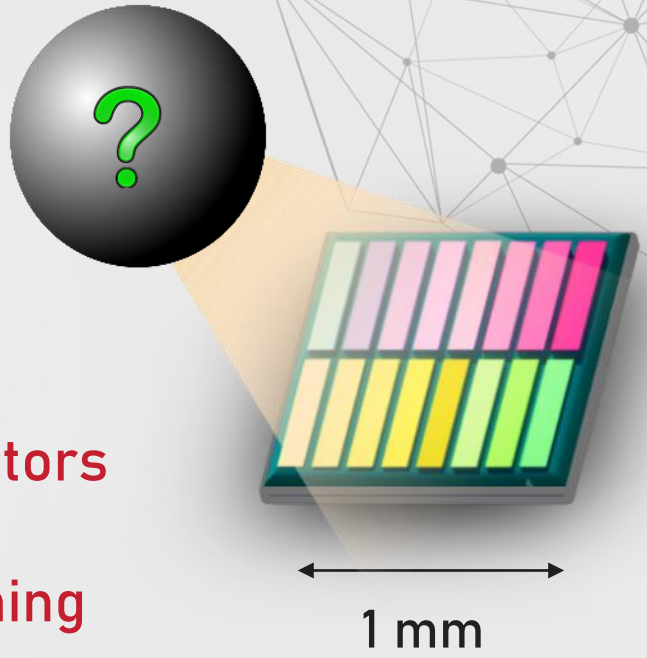


ChipSense™

Real-Time
Miniaturized
High Accuracy
Non-destructive
No-sample preparation
IP Protected
Low-cost

Unique chip-based solution packed with a Brain

"Unknown Material"



Selective Detectors

+

Machine Learning

=

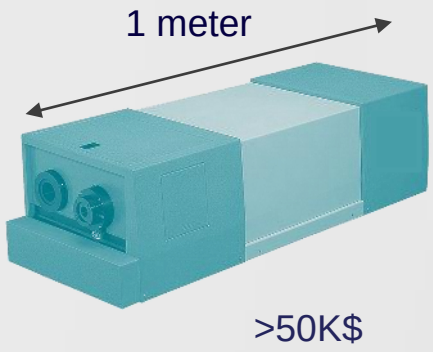
Classification and Quantification of materials using Light

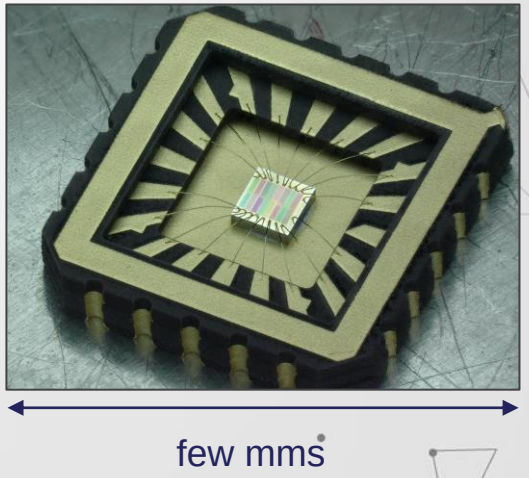
Spectral pixels = Material Fingerprint

IP Protected
WO2017118728A1,
PCT/NL2020/050044,
Dutch No. 2029194

The uniqueness/strength vs competition

- The only **fully-integrated** solution in the near-IR ⇒ **Smaller**
- Measure only the wavelengths you need ⇒ **Faster**
- No mechanical movements ⇒ **Robust**
- Scaling to **large-volume** production ⇒ **Low-cost**

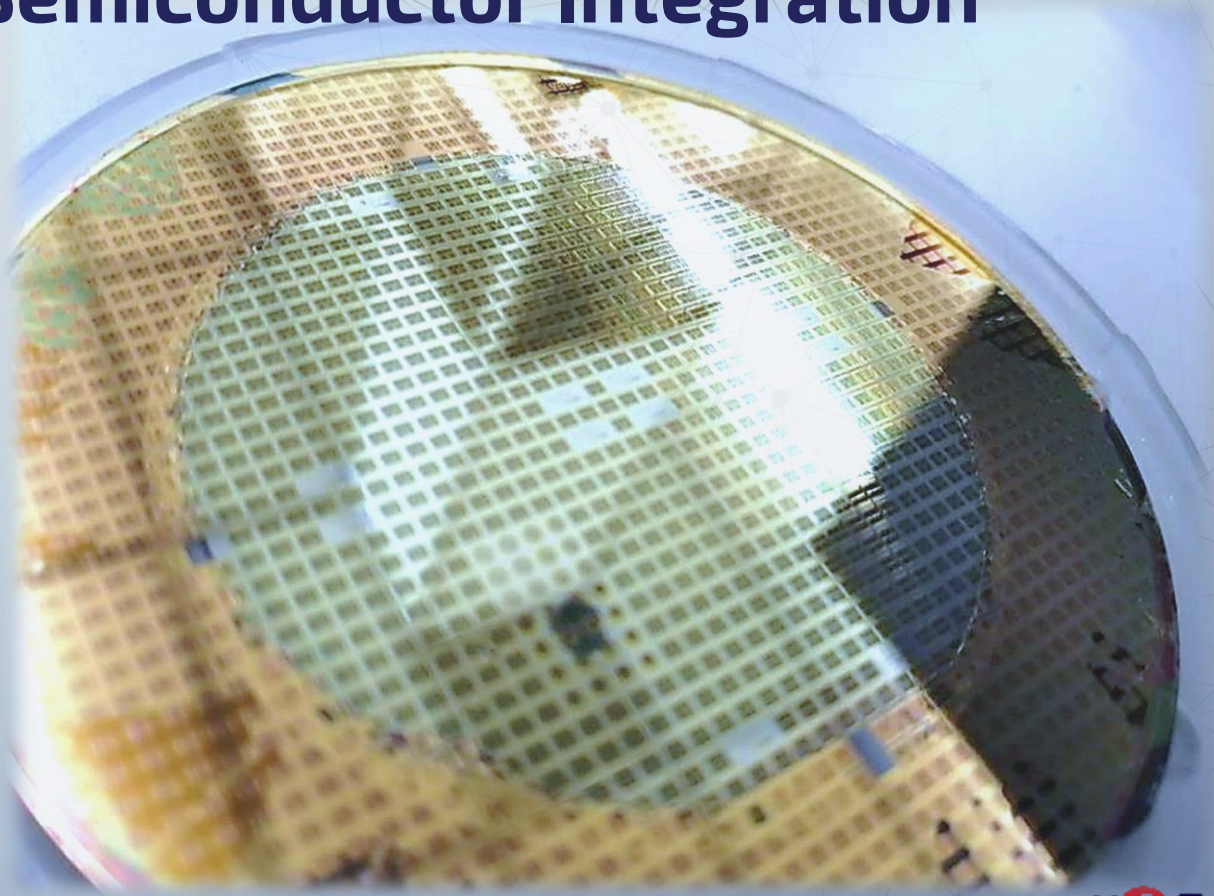




The Beauty of Semiconductor Integration

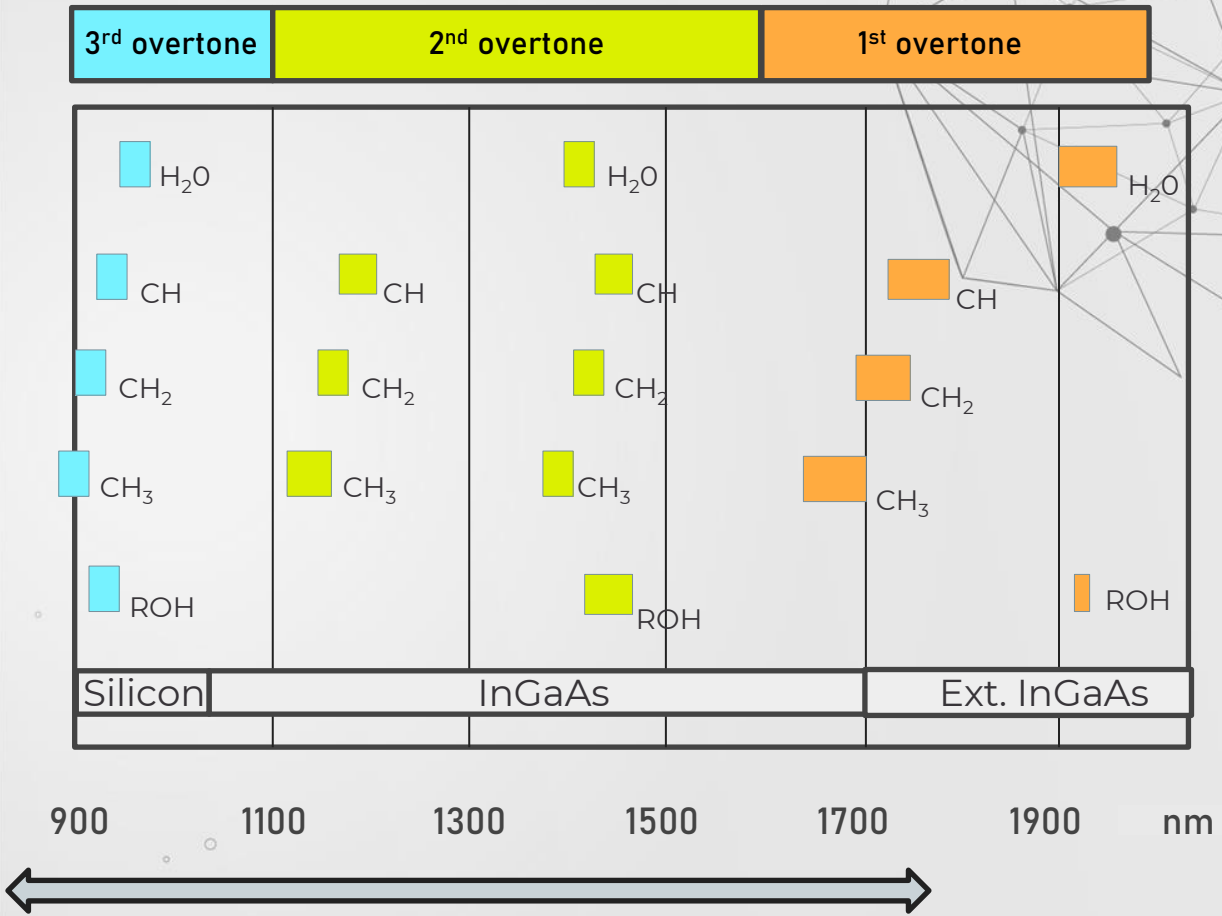
Thousands of Devices
on a single wafer

Unparalleled



MantiSpectra

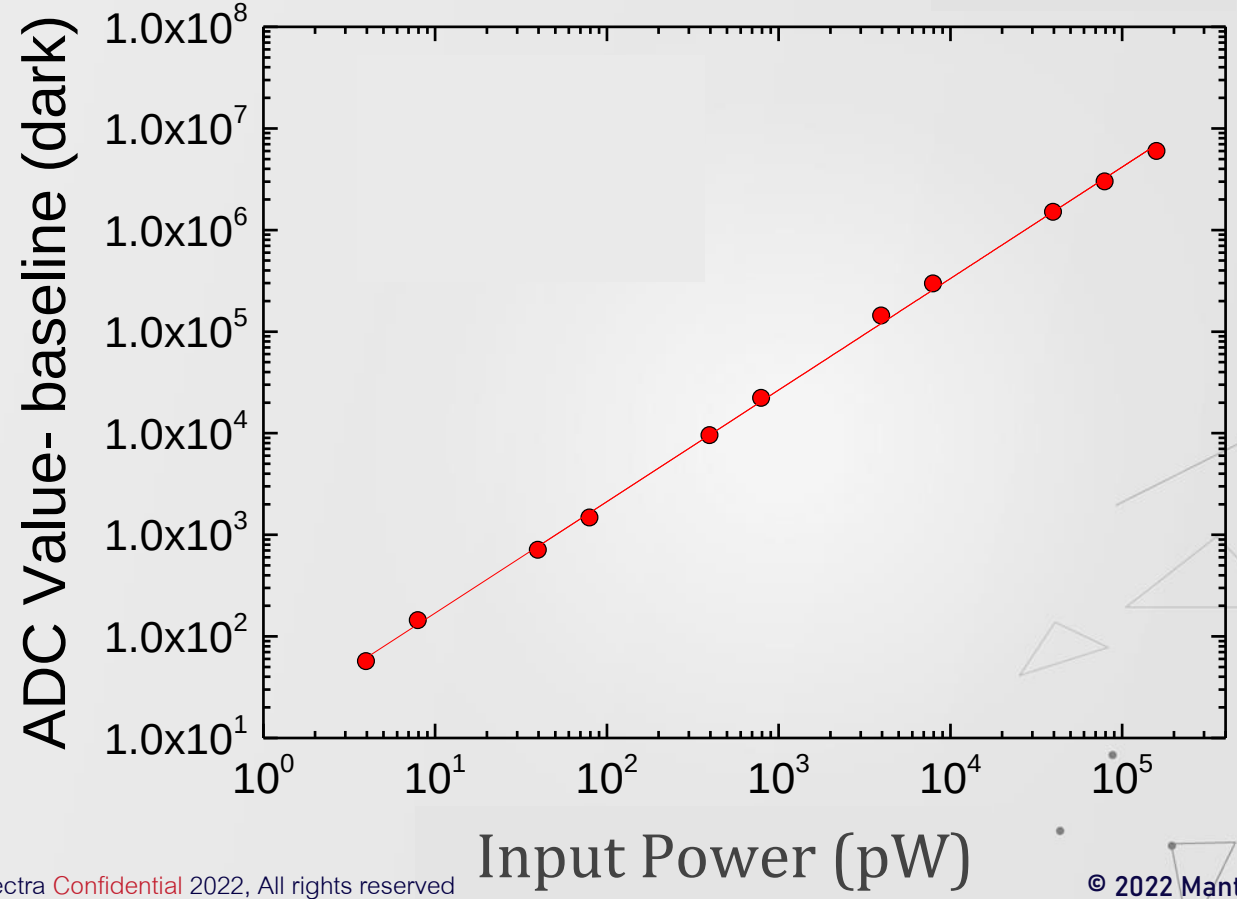
Tech Note 1: Why longer wavelengths? (>1100 nm)



← Absorption range of functional organic group

- The spectral signatures at low wavelength (<1000 nm) are **ambiguous** and have low **absorption**
- **Longer wavelengths** = More sensitive and specific measurements
- Many applications are practically **not possible** in the VIS-3rd overtone region

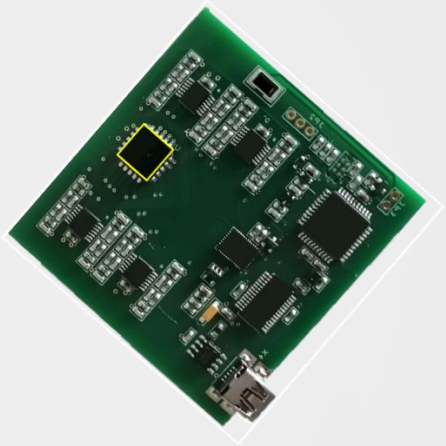
Tech Note 2: How Sensitive?



	FTIR	MEMS	PIC	Filters Based		
				VIS	Organic	**Chipsense™**
Wavelength Range	Ext – SWIR	Sub – SWIR	Ext – SWIR	Less than 1100 nm	SWIR	SWIR Ext-SWIR
Volume Scale-up Low Cost	✗	✗	?	✓	✓	✓
Shocks / Vibrations Resistance	✗	✗	✓	✓	✓	✓
Recalibration Degradation	✗	✗	✓	✓	✗	✓
SNR Sensitivity (Below 1k not reliable results)	1k	0.1K - 1k	1k	0.1K-1k	~ 1k	**>10k**
Proven Tech / Market Ready	✓	✓	?	✓	?	✓

Our Products

OEM Sensing Module



- 16 Channels (850-1700 nm)
- I2C Bus/USB-connection
- Customization possible

SpectraPod™

- Handheld and modular
- Illumination and Optics
- Software: SpectraByte™
- CE/FCC approved

Cloud Enterprise

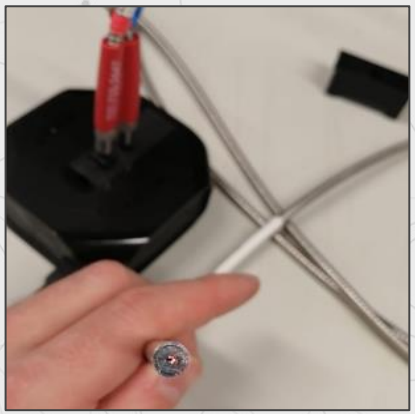
- Cloud subscription
- API interconnectivity
- Real-time Data
- Customization possible

SpectraPod™: A Modular approach for many needs

Interactance

Reflectance

Cuvette
powders and liquids

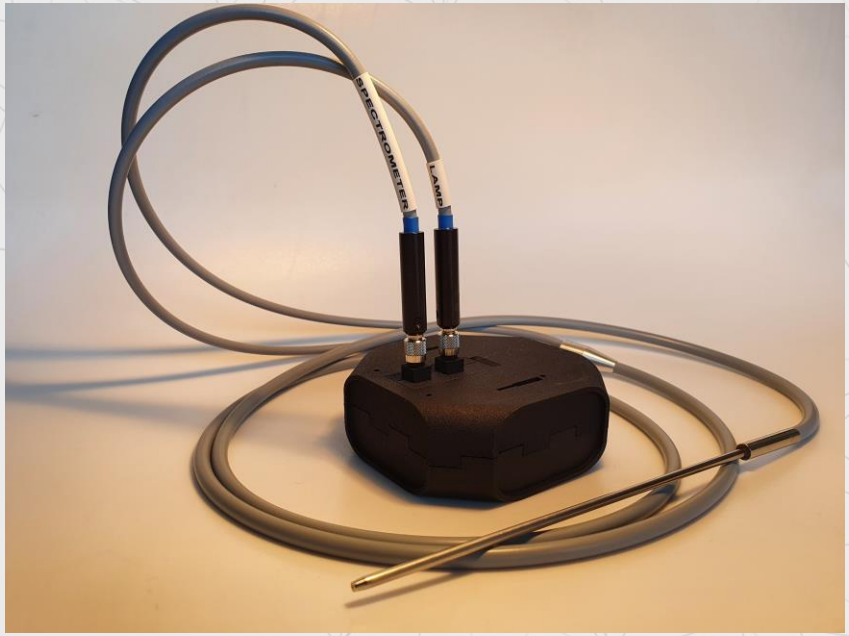


Fibers

MantiSpectra

SpectraPod™: Fiber Version

Technical Specs	
Spectral range	850-1700 nm
Acquisition Time	Selectable. Selectable. ~0.2ms to 140ms, per pixel
Dynamic Range	ADC 24 bits
Number of pixels (spectral channels)	16 depending on the model
Illumination	Single-lamp (integrated)
Illumination power	Selectable via software
Extra Add-ons	SMA Fibers
Operating temperature	-25°C to 100°C
Dimensions	85x85x30 mm^3
Weight	82.5 g
Interfaces	USB (mini-USB B)
Power Supply	USB (mini-USB B)
Software	SpectraByte (Windows 10)



FULL SPECTRAL MODULE, INCLUDING

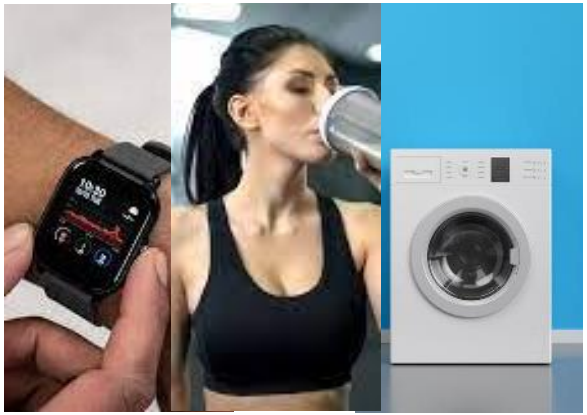
- CHIPSENSE™
- ELECTRONICS
- ILLUMINATION AND OPTICS
- SOFTWARE

MantiSpectra

The future: A non-invasive universal analyzer
To bring process analytics at consumer level

Process & Analytics

- IoT Accurate **Process Control**
- Material and compounds identification
- Cost-effective **resources optimization**
- Traceability, Sourcing, Recycling

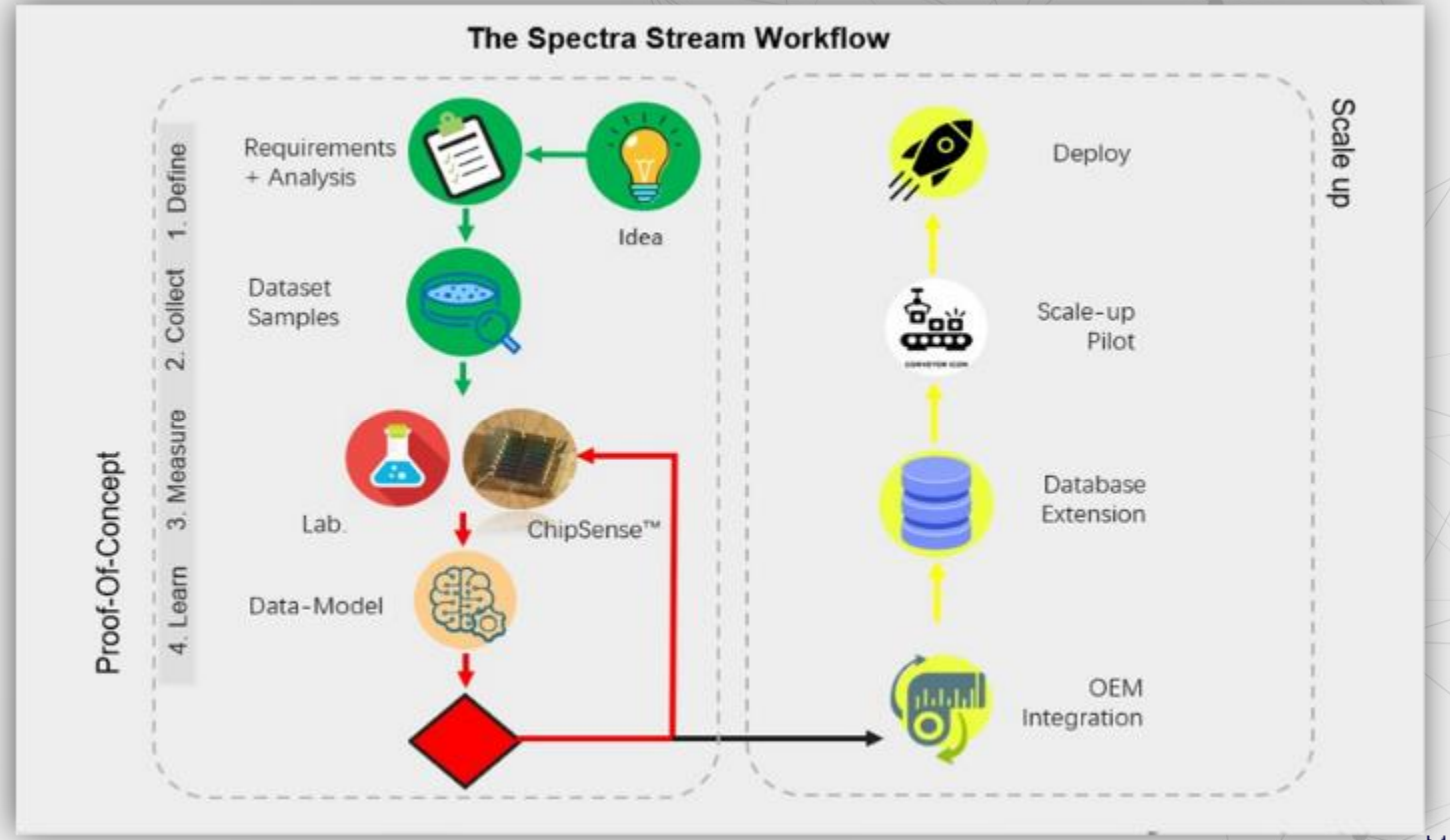


Next-Gen Smart Devices

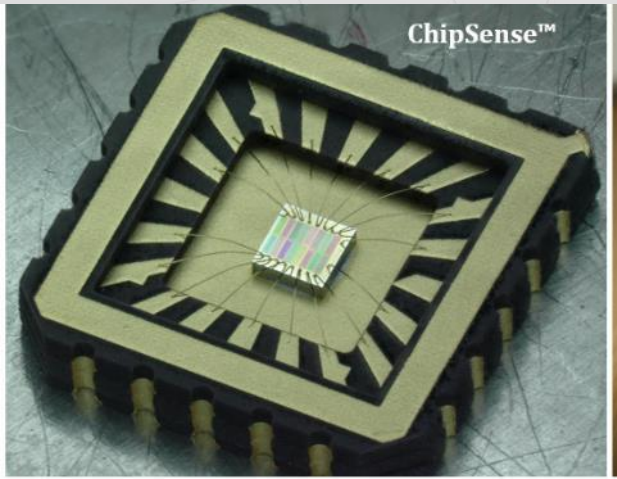
- **Nutrients** profiling in food and drinks
- **Bio-metrics** for healthcare and sport
- House care program **automations**
- Tele-medicine and pharmaceutics

MantiSpectra

Our workflow: The Spectral Stream



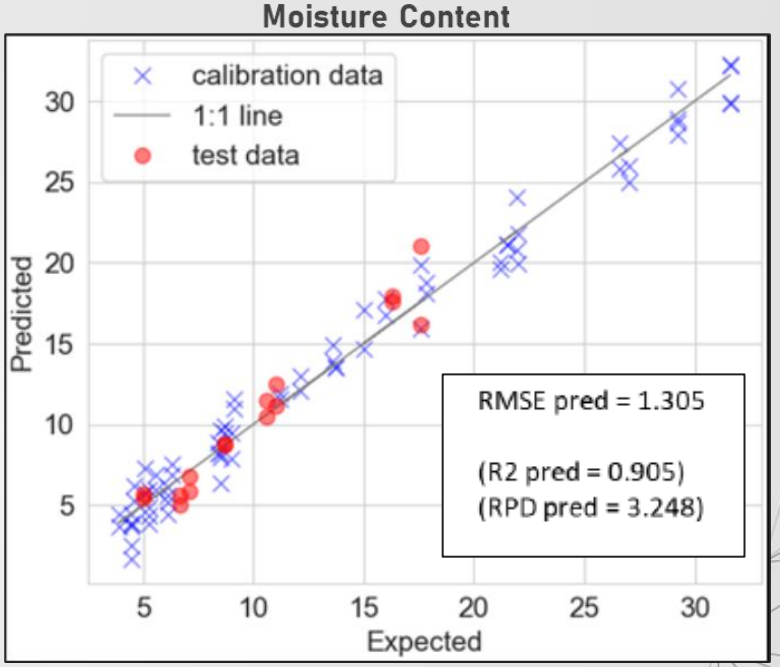
MantiSpectra



Application Cases Examples

Application case 1: Moisture Sensing in Rice

Moisture Content: 95% accuracy in Real time

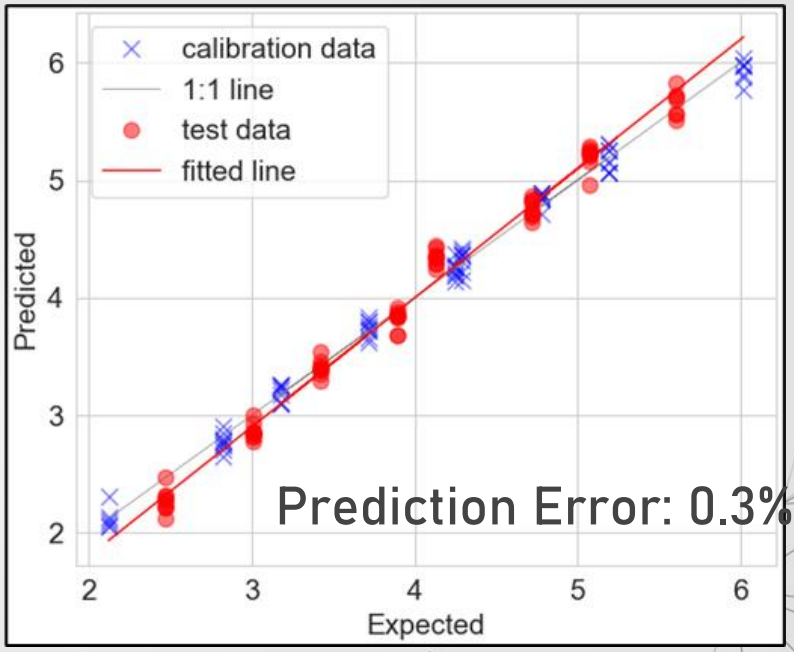


Standard Method: Drying, 24 hours, Oven 130C, → few seconds, non destructive

Application case 2: Fat in Milk

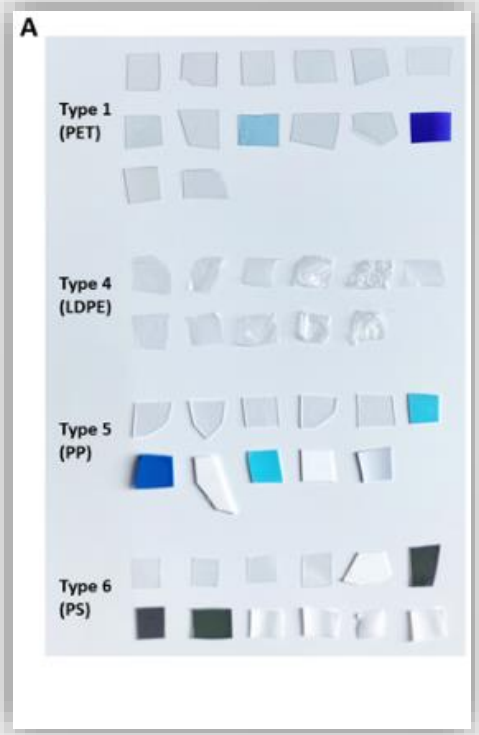
Quantification Accuracy > 98%

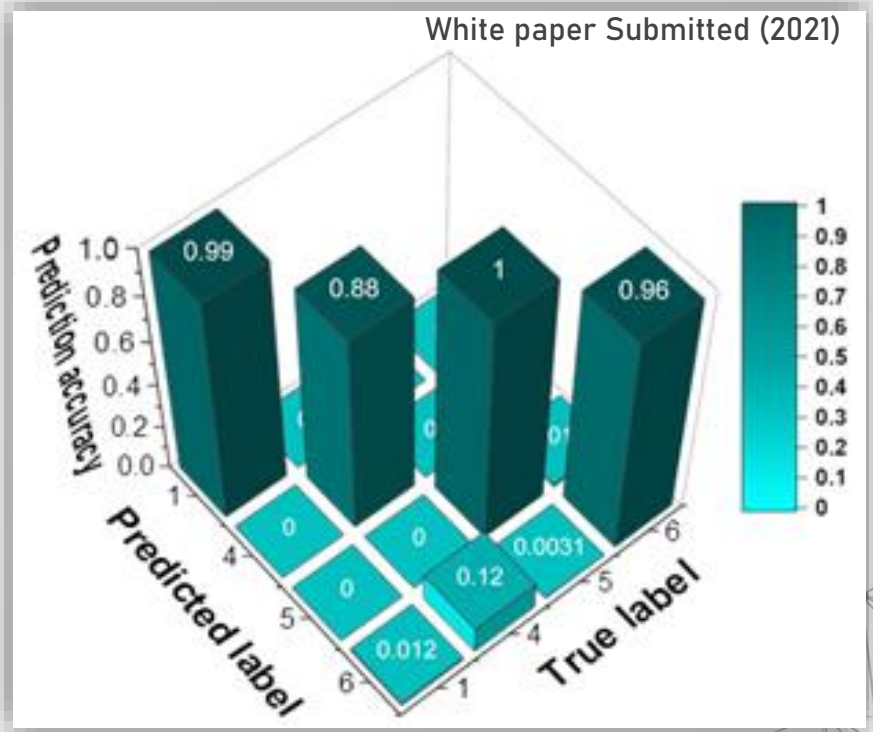
Fat



Application case 3: Plastic Classification

Average Material Classification Accuracy > 95%

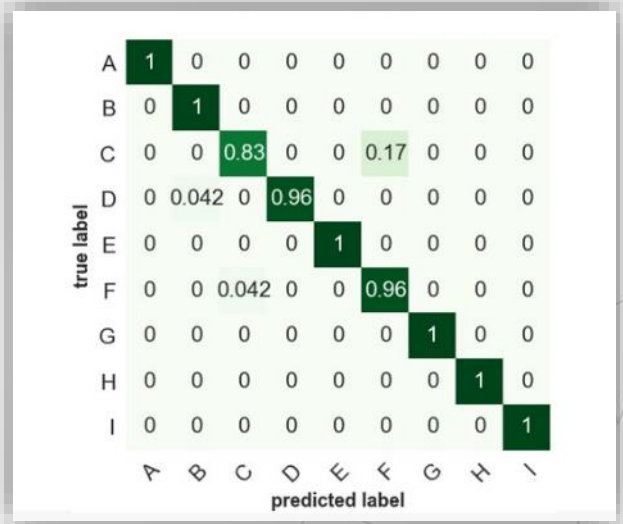


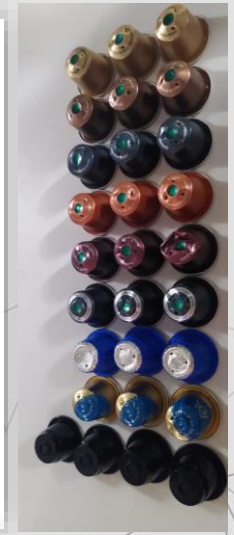


Application case 4: Coffee Classification

Classification Accuracy > 97%

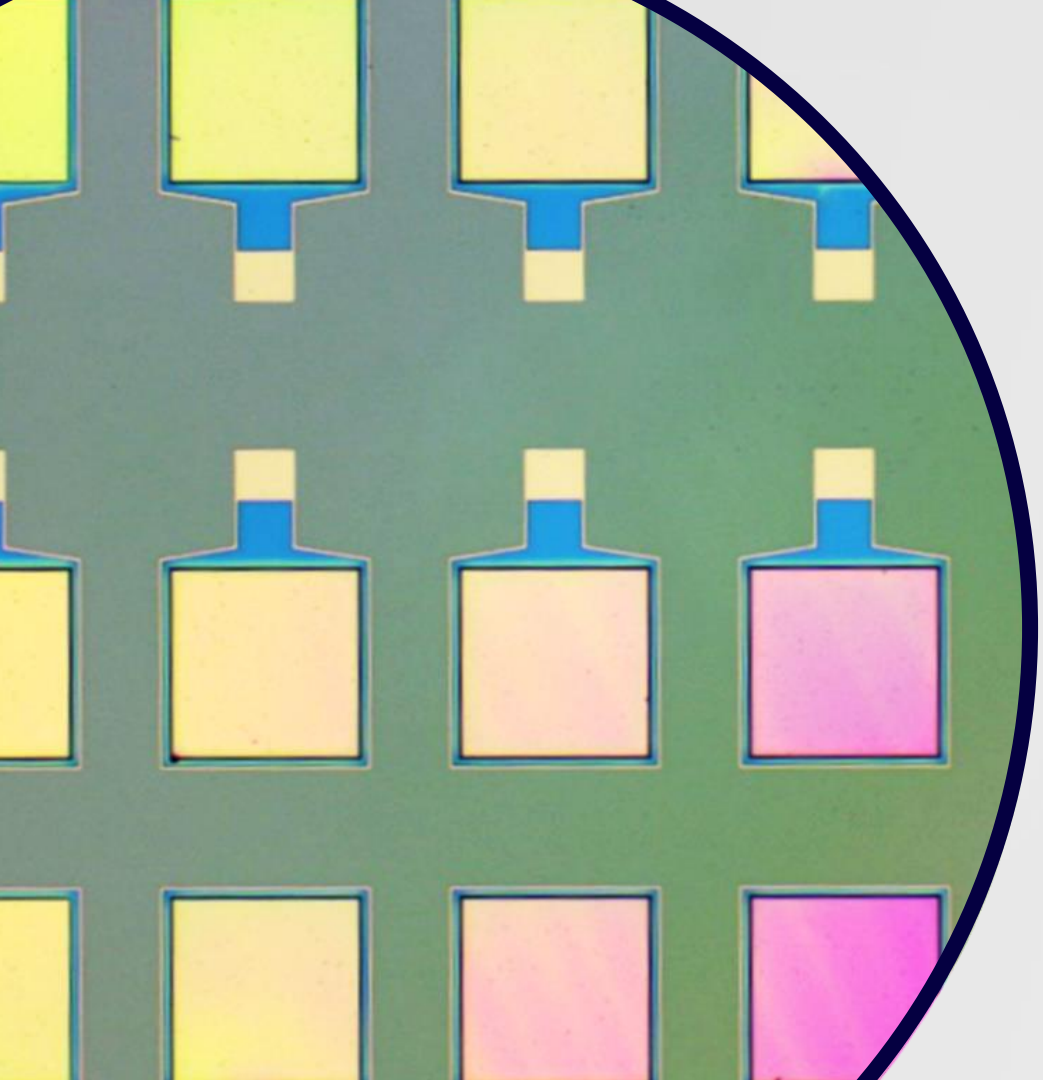
Different origin, roasting, taste





Towards Spectroscopy for everyone

MantiSpectra



A journey in material sensing has just started

Join the Spectral Revolution

info@mantispectra.com

MantiSpectra