

The Spectral Revolution

Lars Benesch

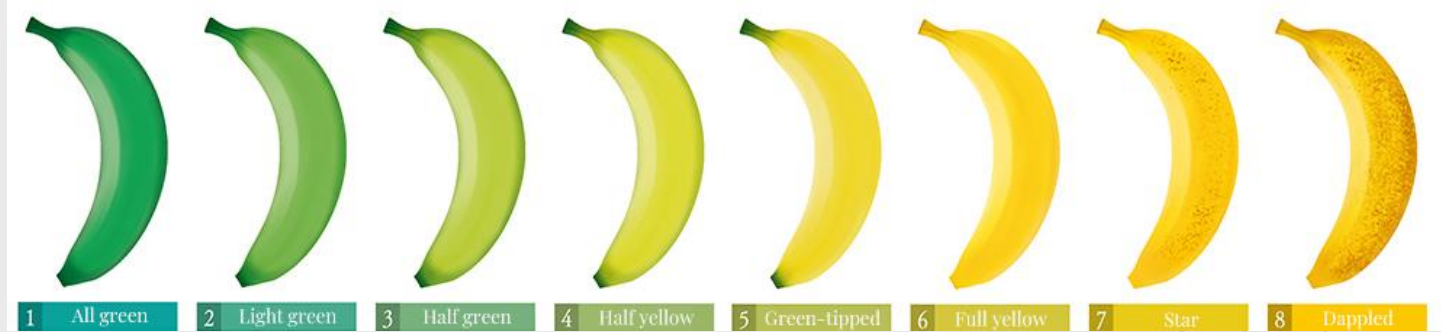
Integrated photonics NIR sensors



MantiSpectra

Lars Benesch, MantiSpectra B.V., Agri-Photonics

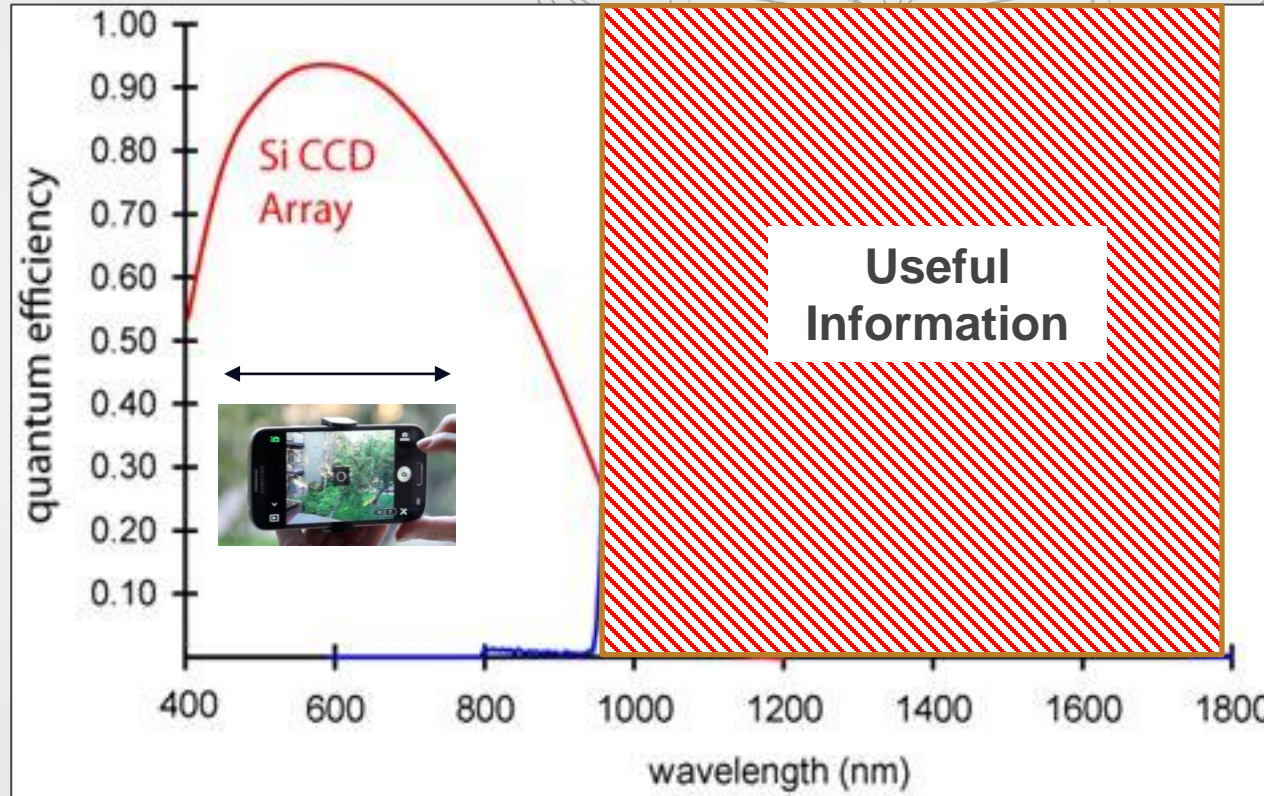
A spin-off of **TU/e** EINDHOVEN
UNIVERSITY OF
TECHNOLOGY



Near-infrared sensing: **seeing the unseen...**

Lars Benesch, MantiSpectra B.V., Agri-Photonics

Near-infrared sensing: **ChipSense™ Technology**





What can you Measure*?

- Moisture
- Proteins
- Fat and oils
- Sugar content
- Starch
- Ripeness
- Firmness
- Acidity
- ...

* Demonstrated in Research

Development Kit

OEM Solution



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

SpectraPod™



- Handheld
- Optics and Illumination Included
- USB-connection
- Software: SpectraByte™

Configurations: A Modular approach



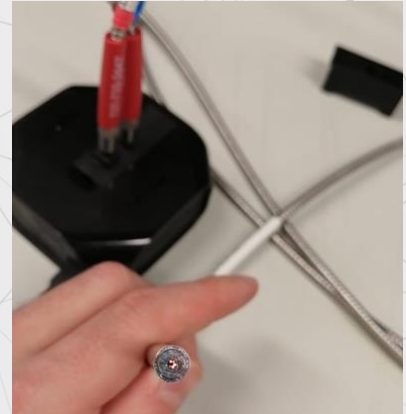
Interactance



Reflectance

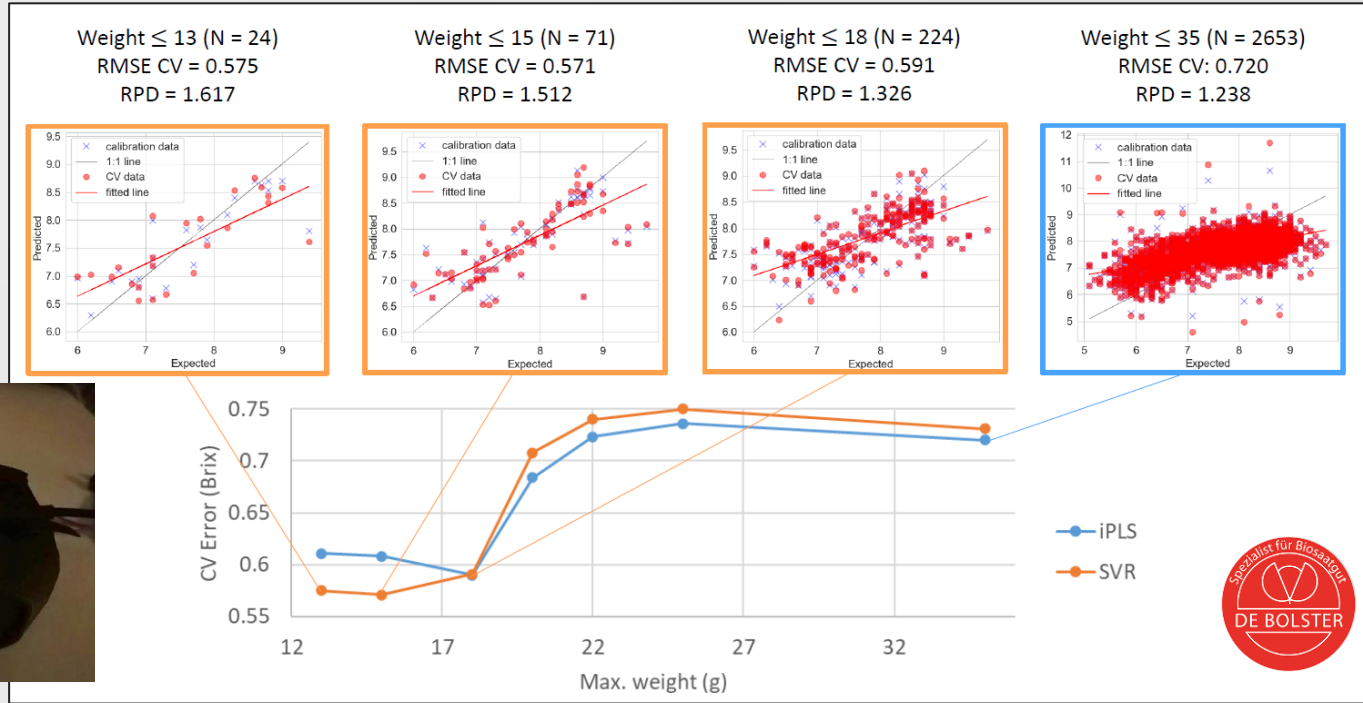


Cuvette
powders and liquids



Fiber

Application case: Sugar/Ripeness level in Tomatoes



Error of Prediction = ~0.57 Brix For small Cherry tomatoes

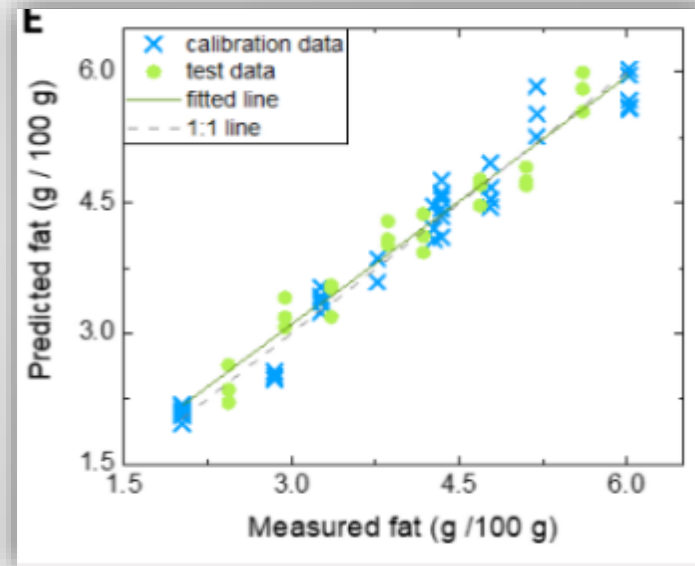


Application case: Fat in Milk

SpectraPod in Action



Fat

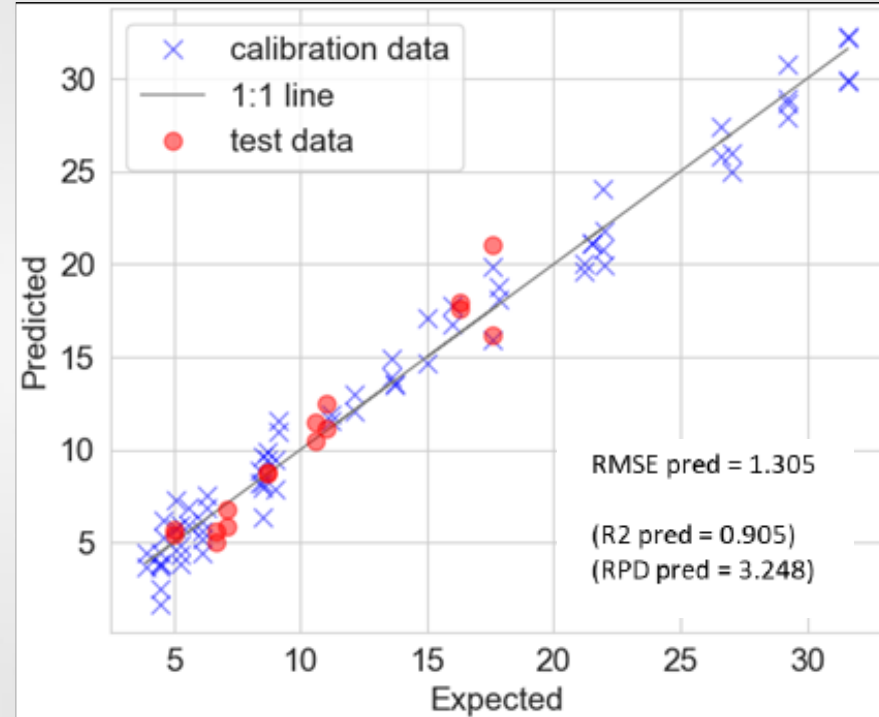


Application case: Moisture Sensing in Rice

Standard Method (Oven 130C, Days)



Moisture Content



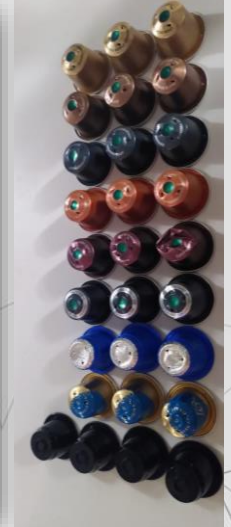
Let's have a cup of coffee...

Different origin, roasting, taste



A	1	0	0	0	0	0	0	0	0
B	0	1	0	0	0	0	0	0	0
C	0	0	0.83	0	0	0.17	0	0	0
D	0	0.042	0	0.96	0	0	0	0	0
E	0	0	0	0	1	0	0	0	0
F	0	0	0.042	0	0	0.96	0	0	0
G	0	0	0	0	0	0	1	0	0
H	0	0	0	0	0	0	0	1	0
I	0	0	0	0	0	0	0	0	1
	A	B	C	D	E	F	G	H	I

predicted label



Classification Accuracy > 97%

**A journey in
material sensing
just started.**

**Join the
Spectral Revolution**