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Applications in agriculture enabled by photonics

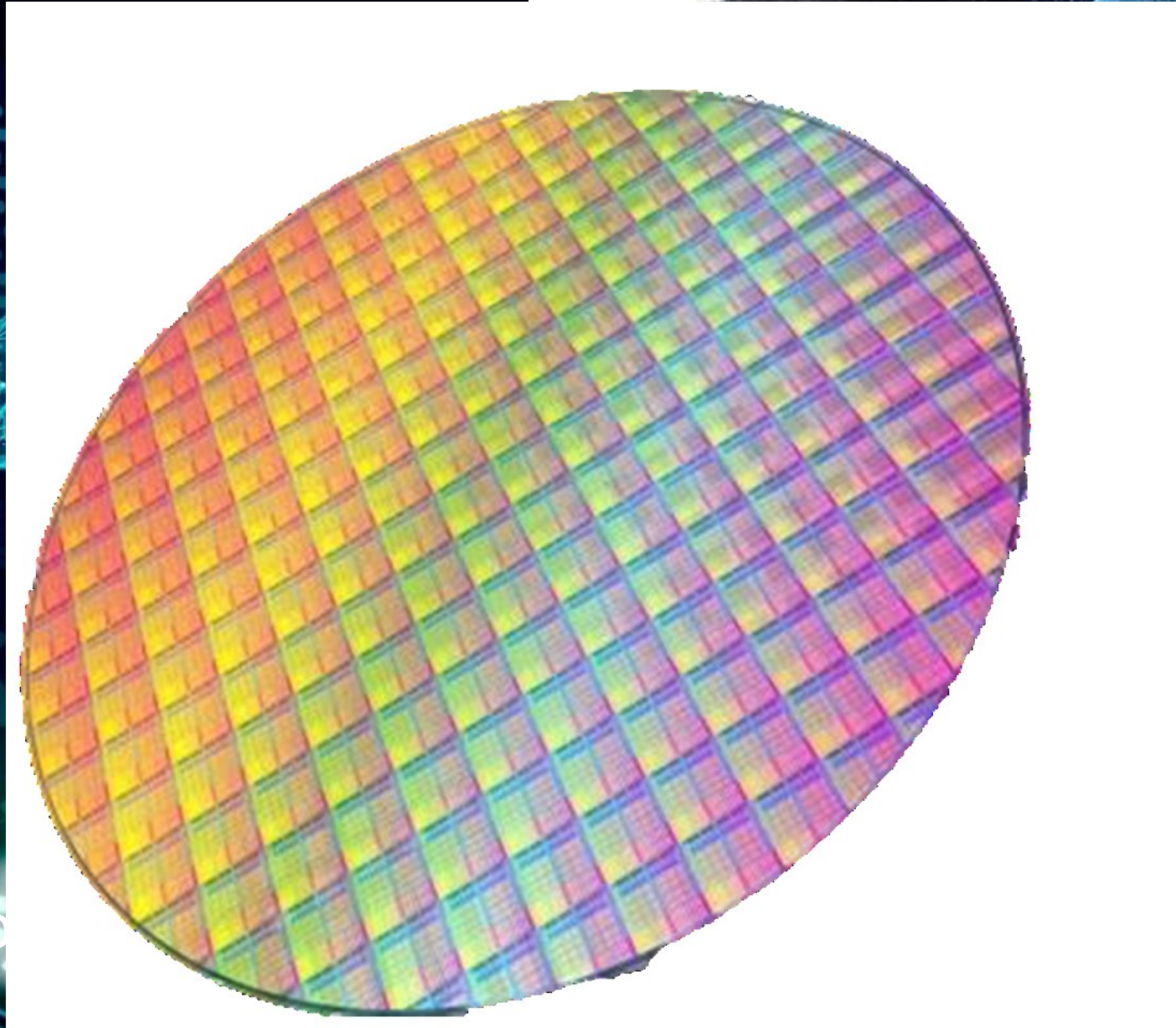
Marcel Zevenbergen, program manager emerging sensors

Founded by 4 key research centers in their domains





**SENSORS &
DIGITAL TWINS**
for
Autonomous growth
&
Food processing



**SENSORS &
DIGITAL TWINS**
for
Preventive Health
&
Early Signaling



Digital quantitative data

Weather forecast

Weather measurement

Weather hindcast

Energy cost

Water availability

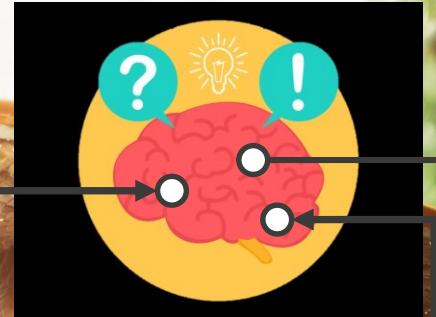
ESG score

Indoor climate condition

Market demand

Production target

Sustainability target



'My crops looks too vegetative at this moment, let me increase the temperature a bit and try to steer the temperature a bit and try to steer the nutrients to fruits..'

Magic green thumb

Visual observation

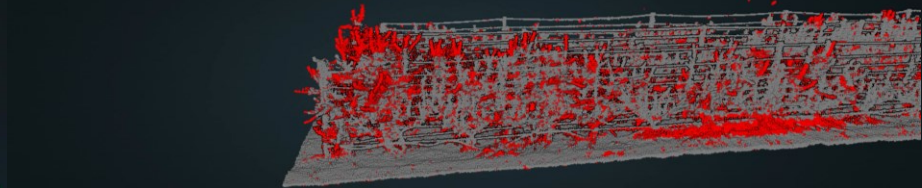
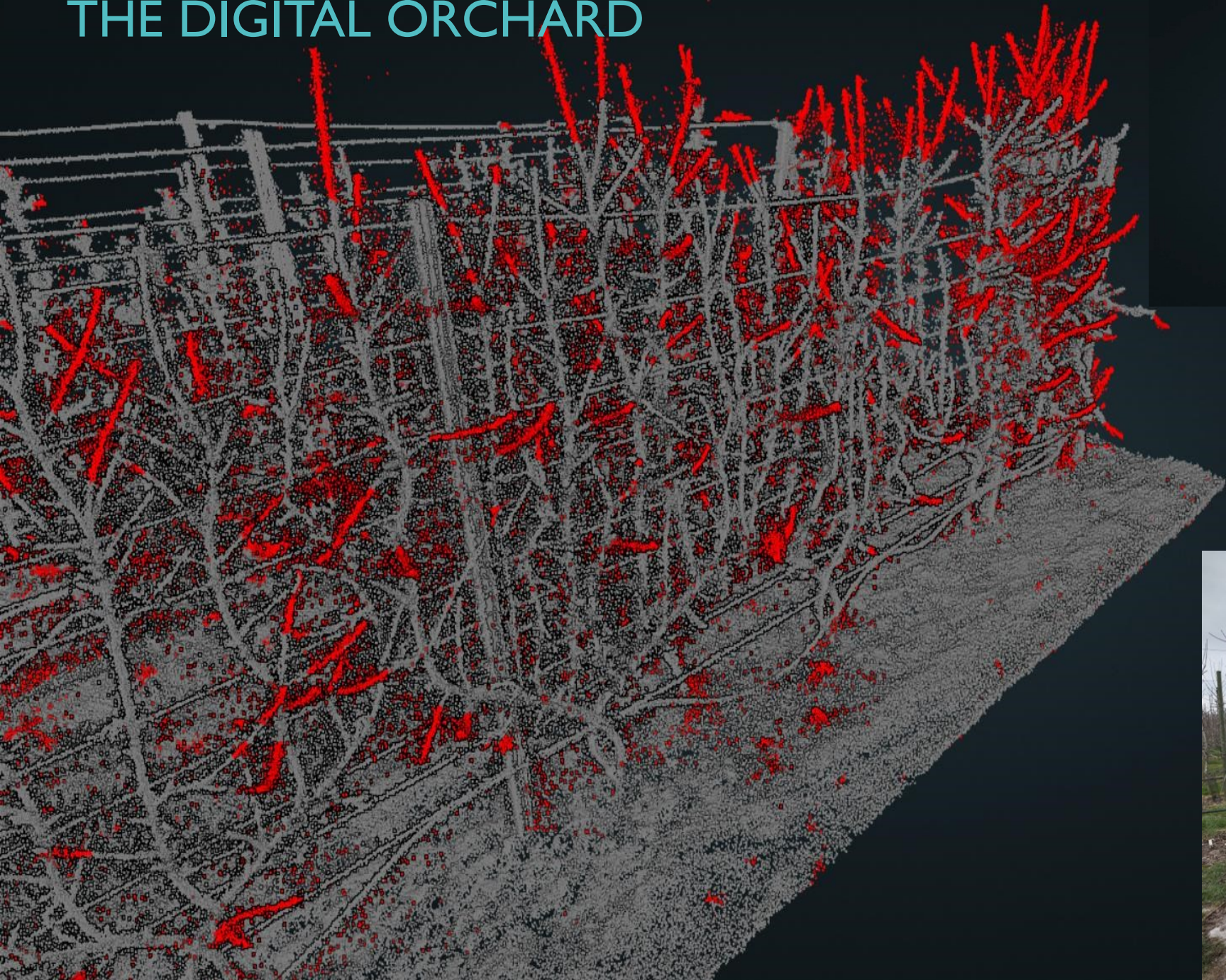
Odor smell

Manual touch

'Gut feeling;

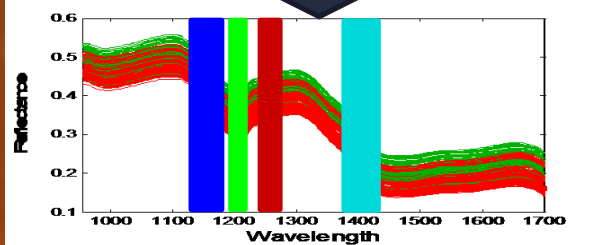


THE DIGITAL ORCHARD



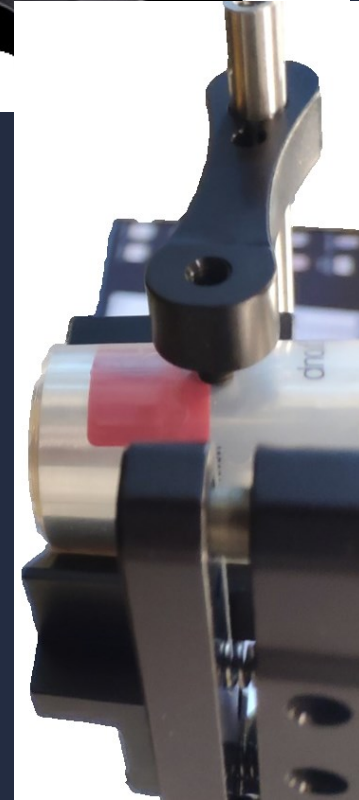
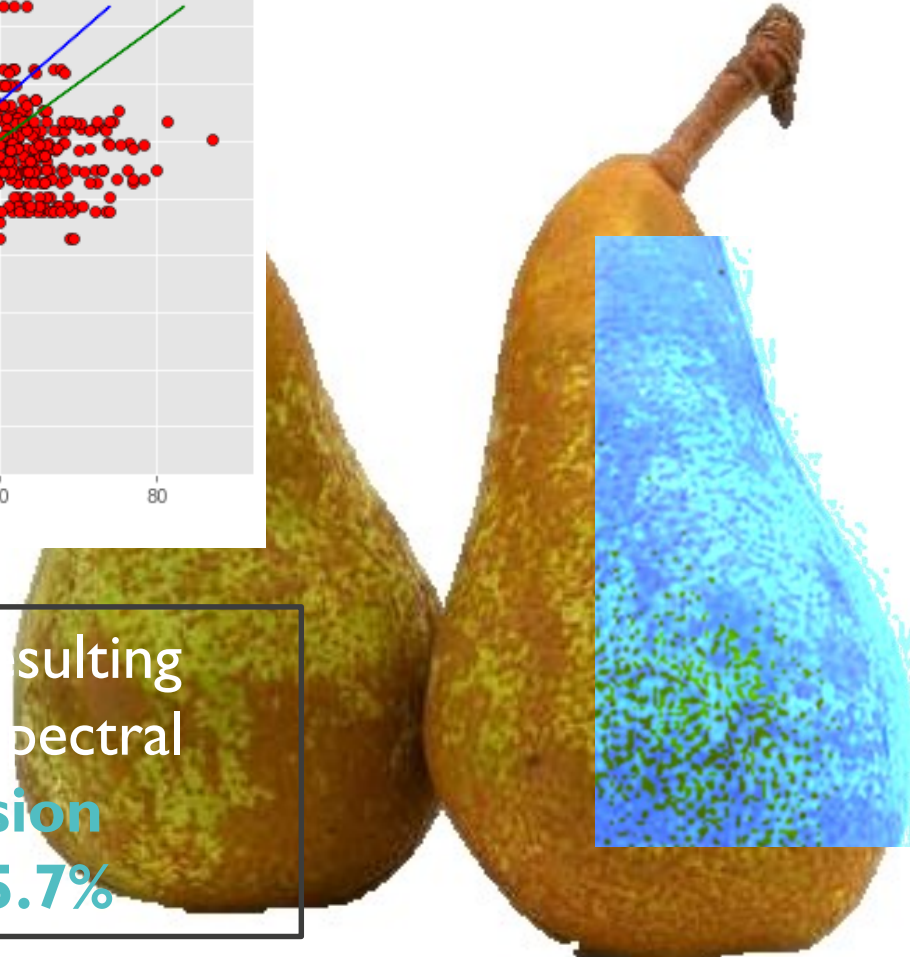
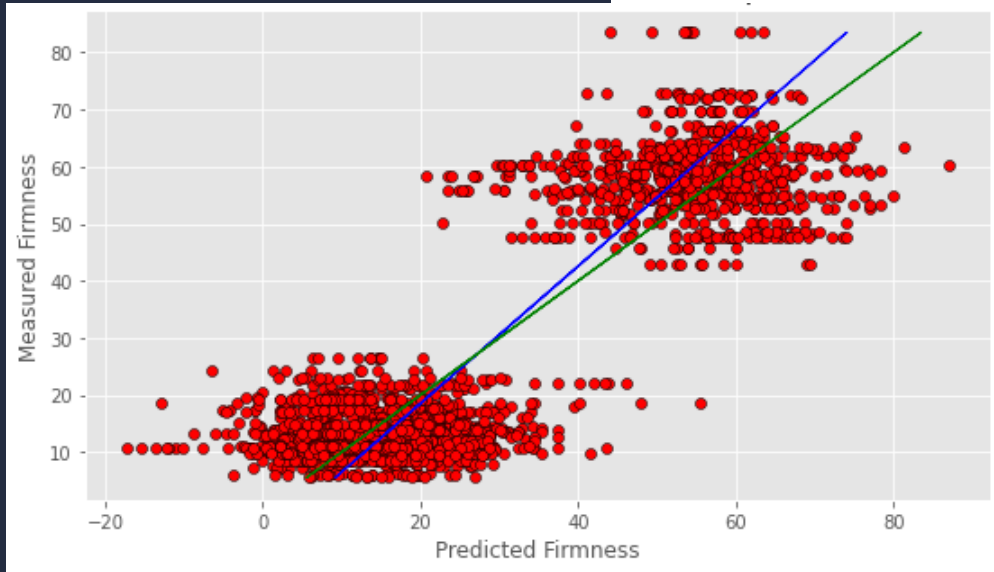


DETECTION OF PESTS AND DEFECTS CAUSED BY INSECTS



Non-invasive fruit quality monitoring

Example pear firmness



Combining latent vectors resulting from ultrasound and hyperspectral models in a Late **Deep Fusion** approach results in **$R^2 = 95.7\%$**

OnePlanet Research Center is an innovation center for nano- and digital technology in agriculture, food, health and environment. It is a multidisciplinary collaboration between nano-technology research center imec, Wageningen University & Research and Radboud University/Radboudumc.

At the crossroads of agriculture, food, health and high-tech we develop game changing innovations that contribute in solving the major societal challenges in the areas of climate, sustainability and preventive health.

We combine domain expertise with expertise on sensors, sensor connectivity and data science/AI into application innovations.

We work on solutions in close collaboration with industry partners worldwide



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