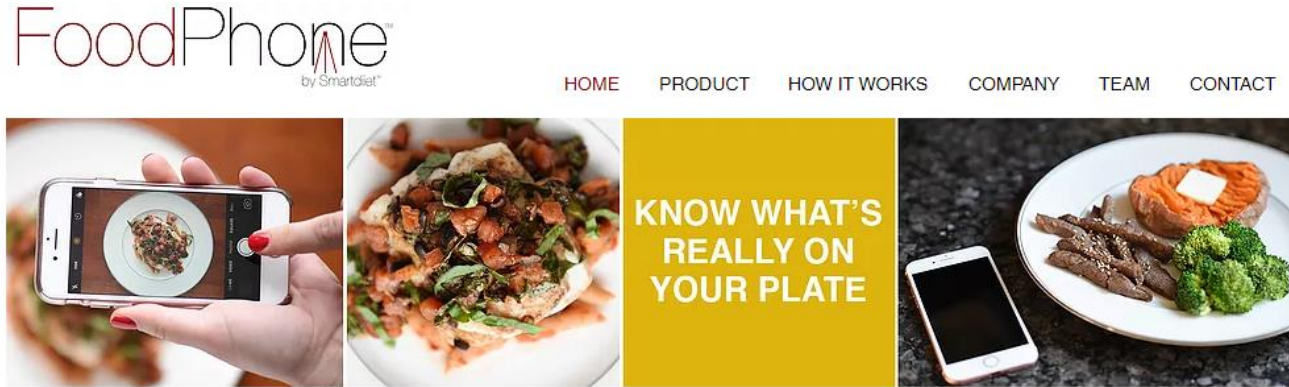


Towards dietary intake assessment using image analysis

Yannick Weesepeol – Wageningen Food Safety Research



What the web promises...



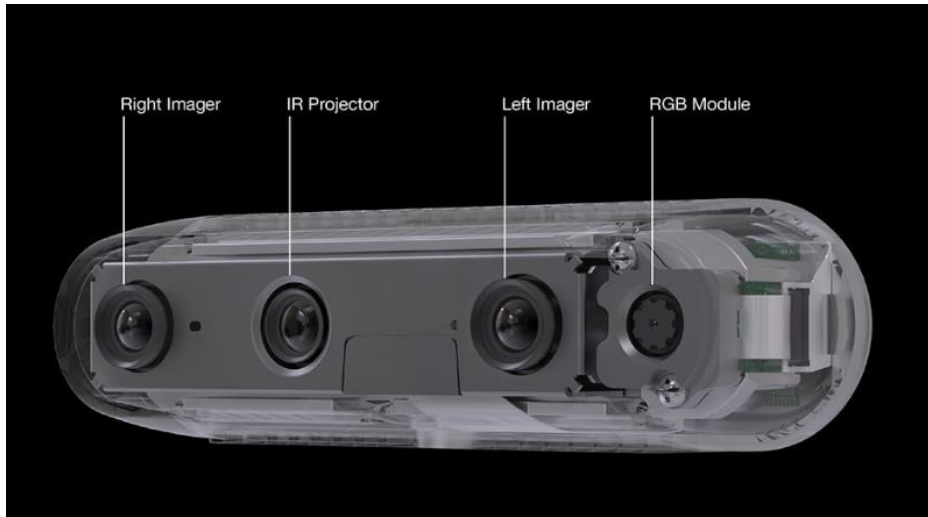
Affordable mobile 3D hyperspectral sensor built right into a standard smartphone.

FoodPhone accurately identifies the amount and composition of food without touching it.

No user typing or estimating. No additional equipment.

Get a scientific analysis of what's on your plate presented in familiar Nutritional Fact Labels.

What is actually required



Intel Real Sense Depth Camera



Specim IQ VISNIR Hyperspectral Camera

Most common problems in dietary intake studies

Vegetables



Butter



Challenges on intake: vegetables

- Food classification from real sense camera
- Volume estimation using:
 - **Moving** Depth estimation from multiple images structure from motion
 - **Stationary** depth sensor



Carrot

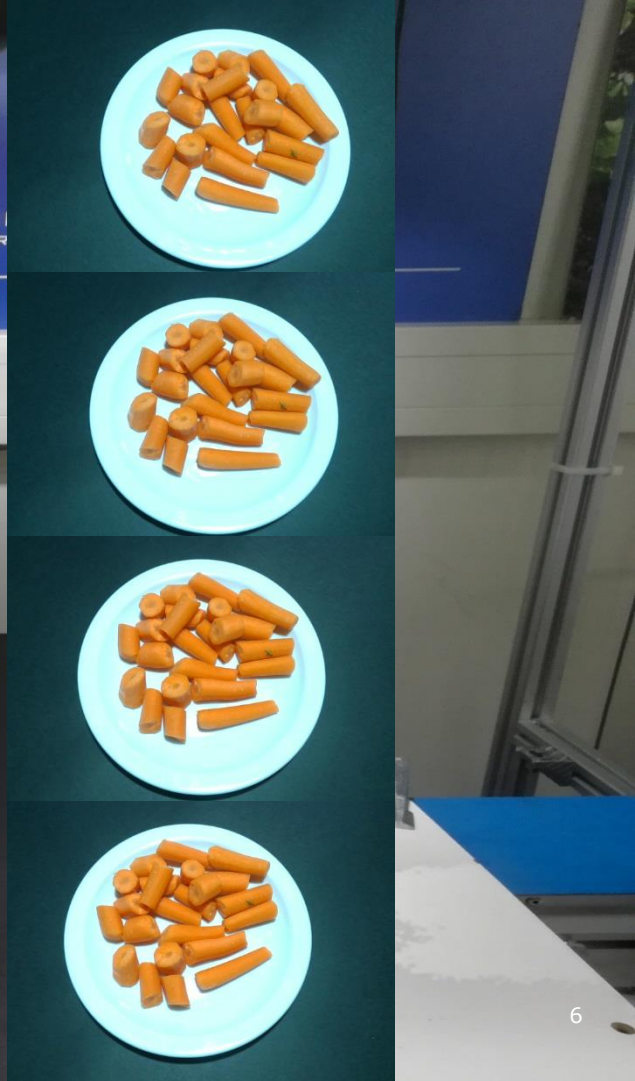


Spinach

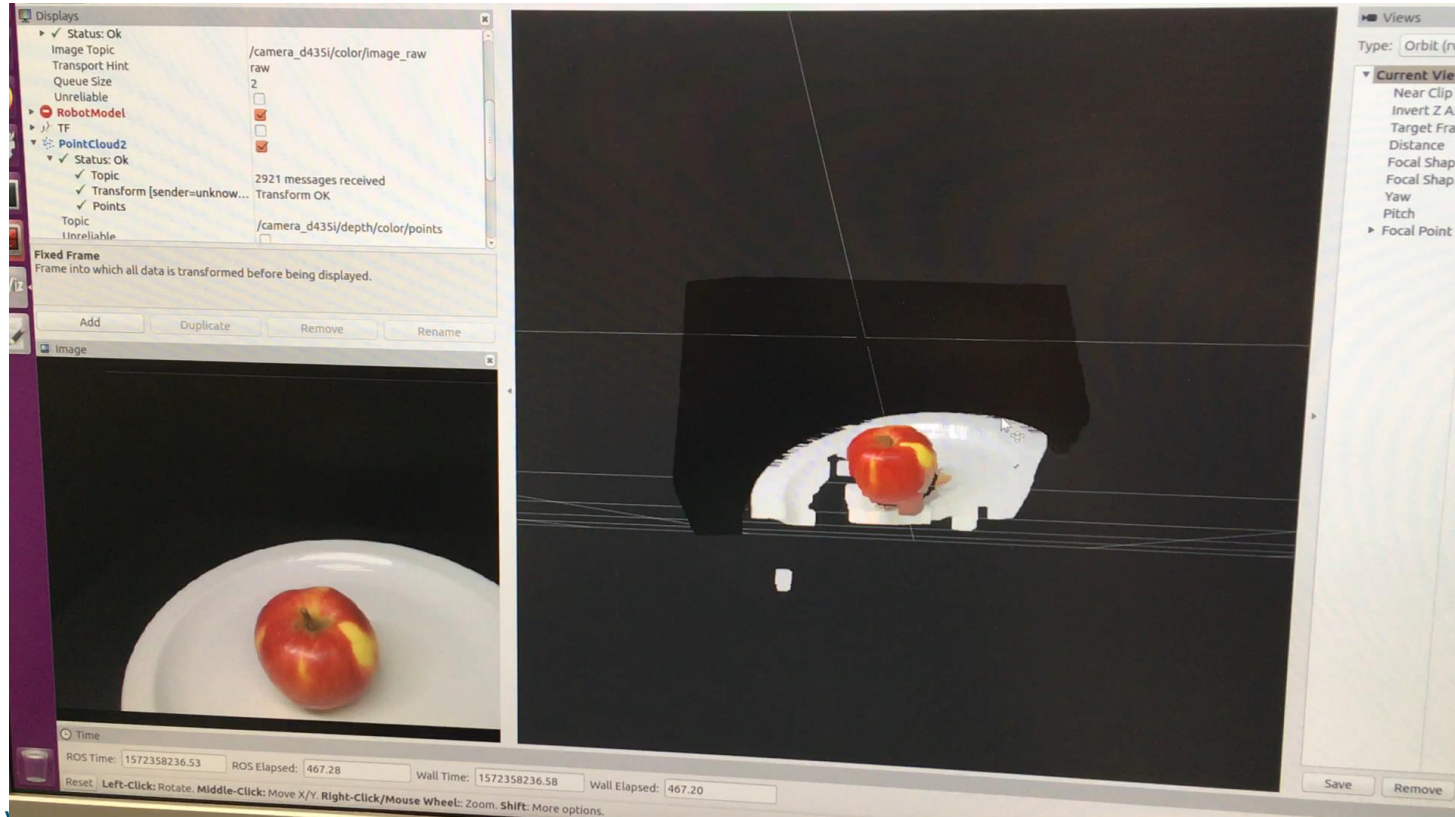


Endive

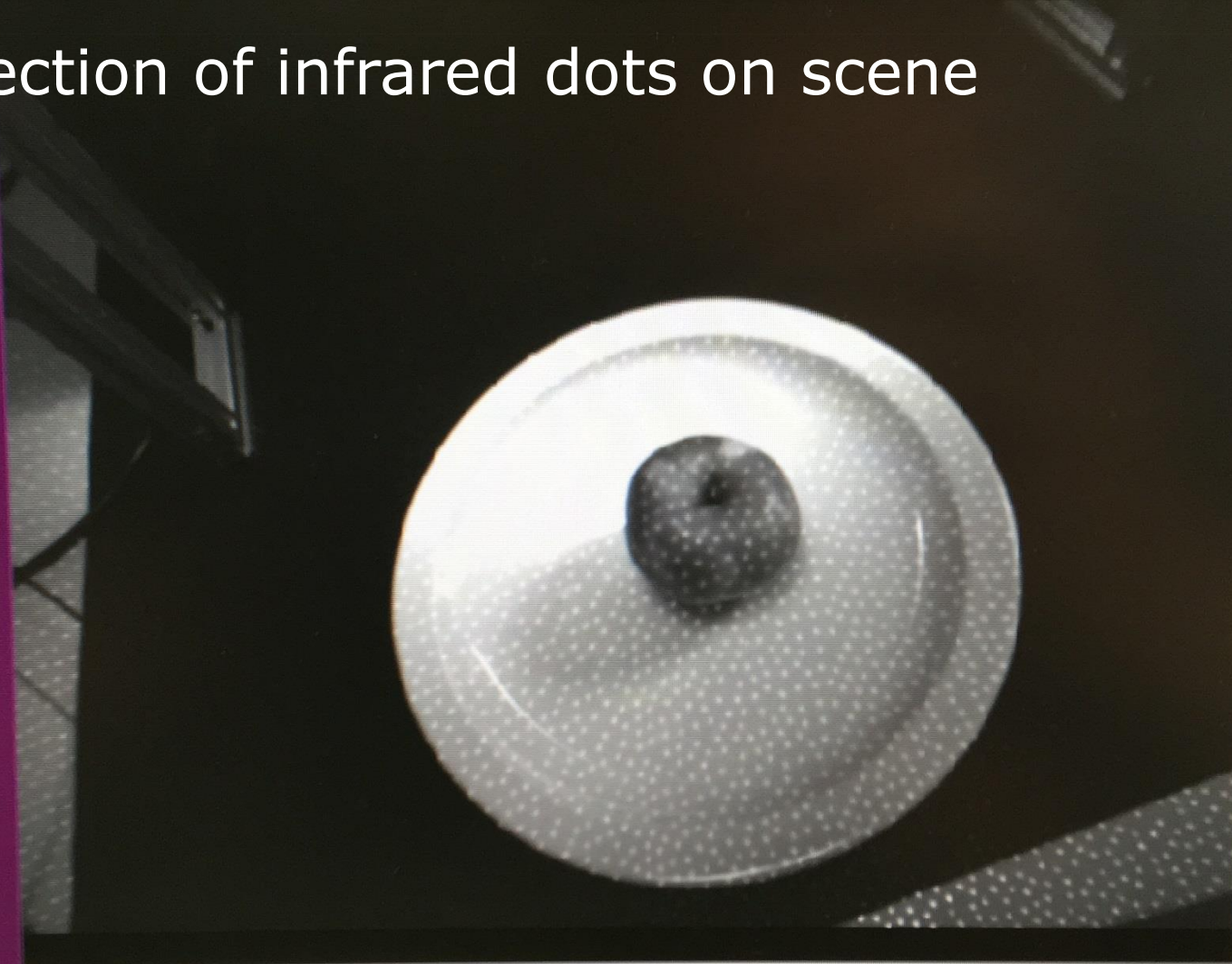




Structure by motion



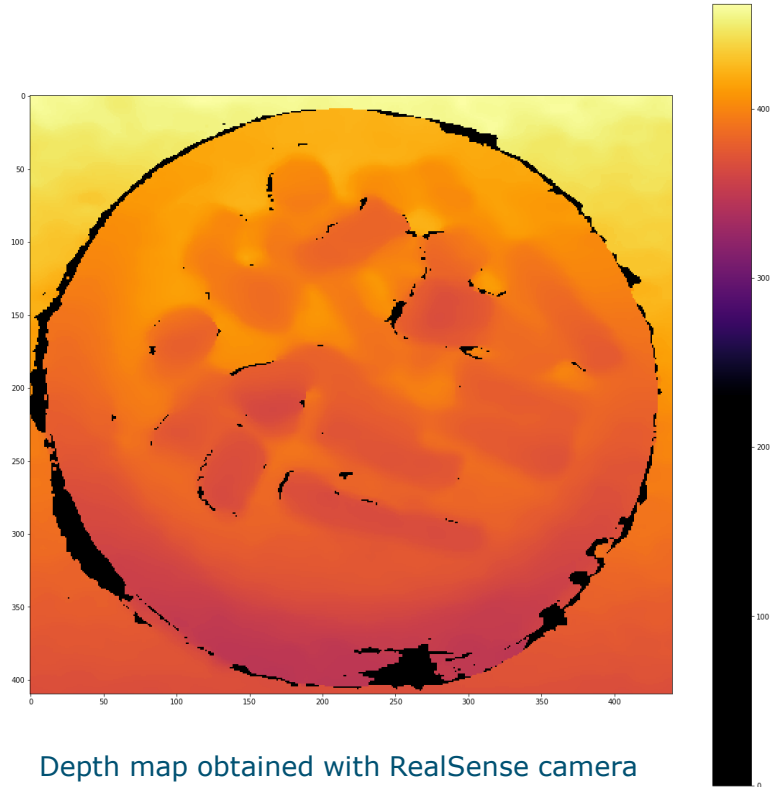
Projection of infrared dots on scene



Volume estimation



Colour image obtained with RealSense camera



Depth map obtained with RealSense camera

Challenges on composition: Intake of bread with butter

- Discriminate bread from butter
- Quantify macro composition of butter
 - Total fat, total saturated fats, vitamins
 - Other nutritional properties
- Quantify layer thickness of butter on bread (estimate total amount of butter)
- Quantify amount of total bread-butter system eaten



Required system: Hyperspectral imaging

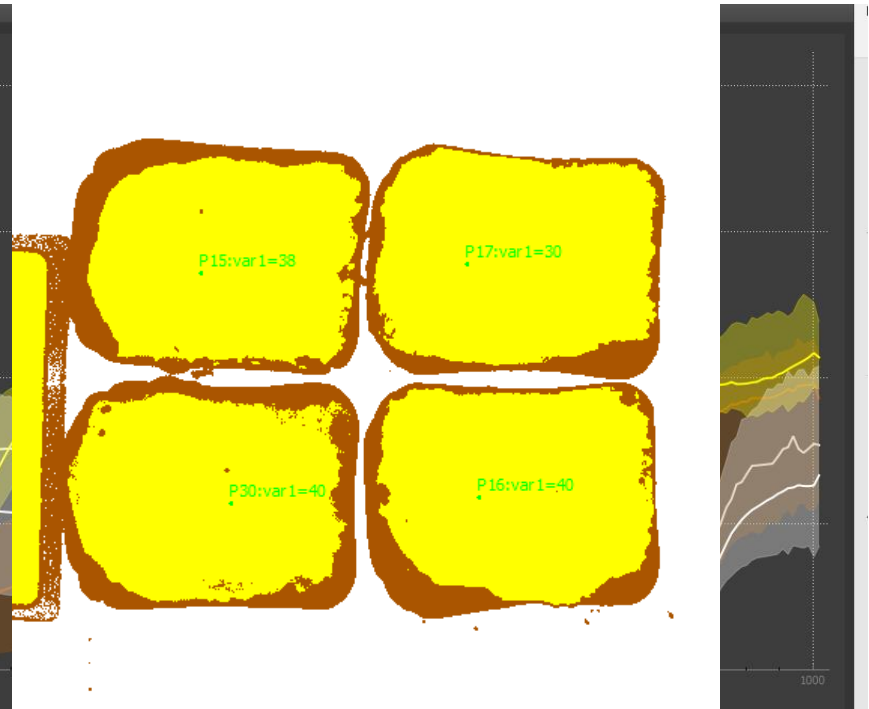
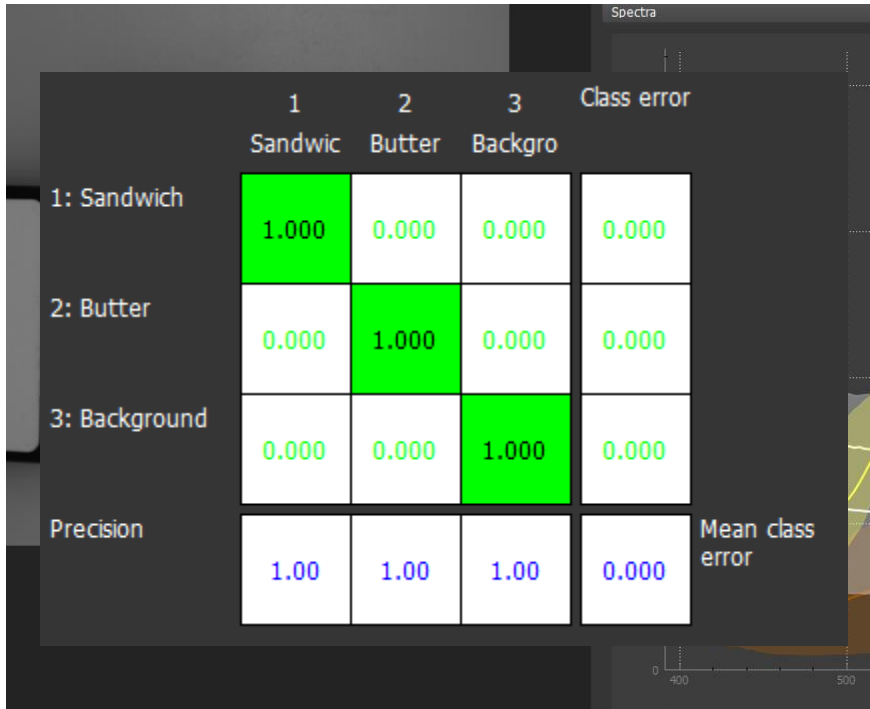
- Portable SPECIM IQ VisNir
- 400 – 1000 nm
- Area scan camera



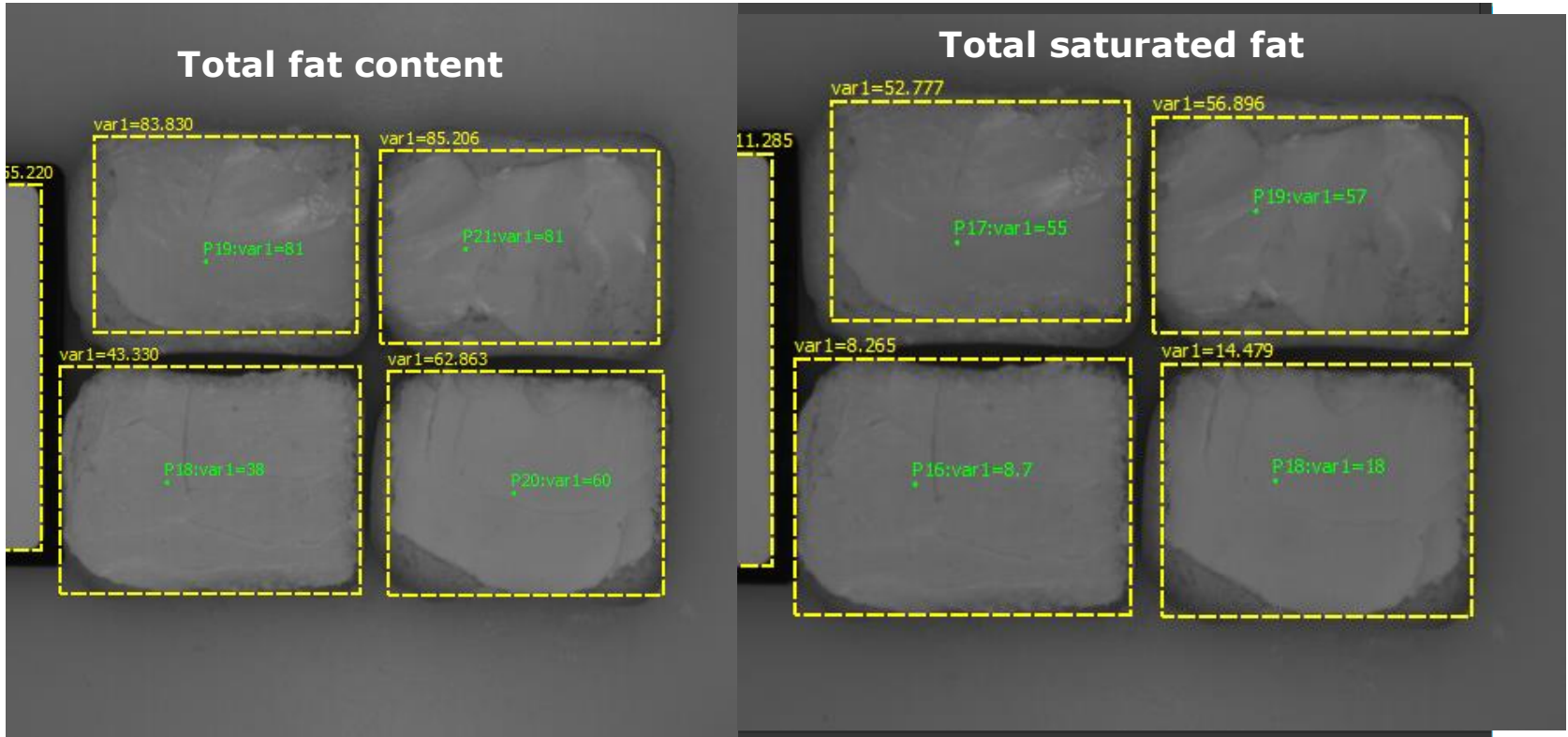
(i) Discriminate bread from butter



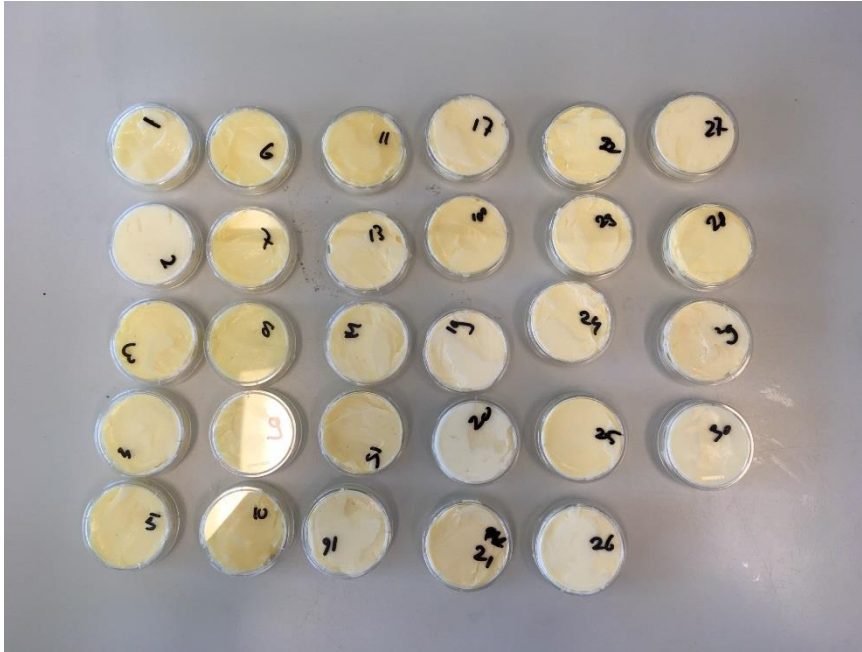
(i) Discriminate bread from butter



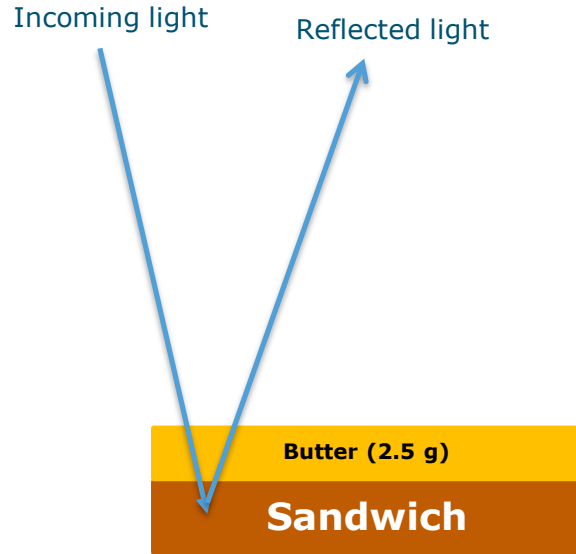
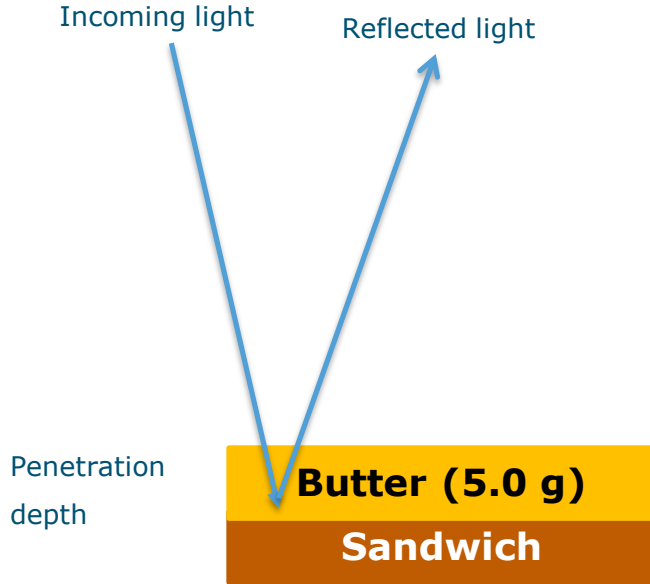
(ii) Quantify macro composition butter



(ii) Quantify macro composition butter

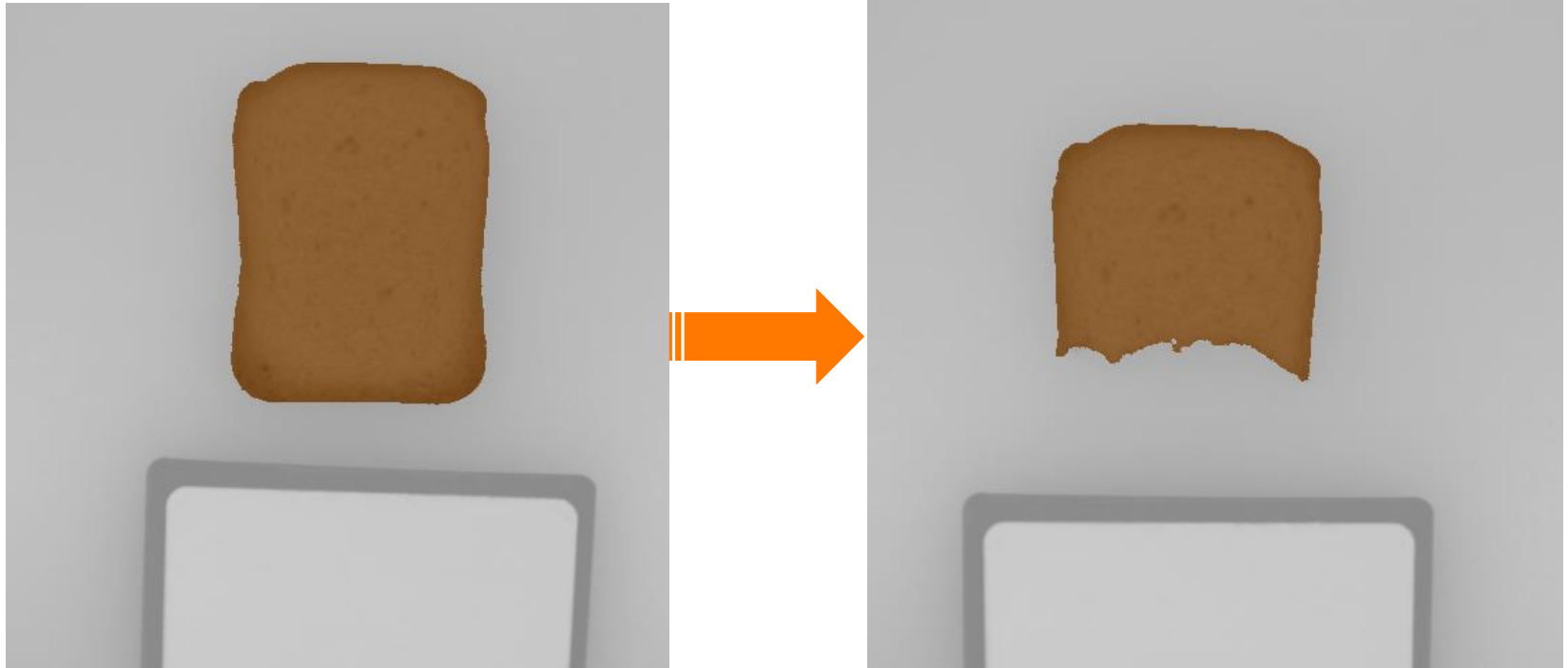


(iii) Quantify layer thickness of butter

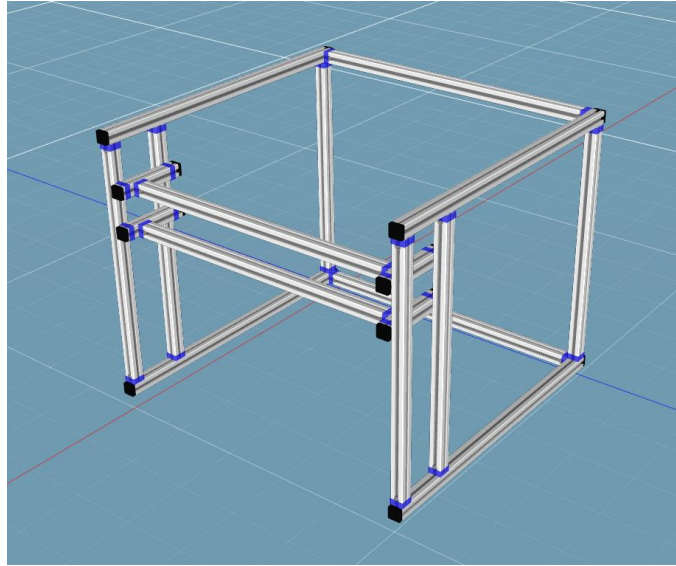


Simulate light propagation through sample

(iv) Quantify ingested amount



Combine both cases in one setup: work in progress



- Build meta-data layer
- Cohort study executed at WUR in 2020

Meet the team!

- Wageningen Food Safety Research
 - Yannick Weesepeel
 - Martin Alewijn
 - Leontien de Pagter
- Wageningen Food and Biobased Research:
 - Jan Top
 - Freek Daniels
- Wageningen University, dept Human Nutrition and Health:
 - Edith Feskens
 - Mireille Baart



Thank you!

