















Administration of Public (Government) using V-MIS System

Abstract  
Introduction  
Methodology  
Results  
Conclusion





MPG  
GVT  
Seymour, Prof. Dr.  
GVT













# Water diffusion in biofilms with different physical structures

M. P. Herrling<sup>1</sup>, J. Weisbrodt<sup>2</sup>, H. Horn<sup>3</sup>, S. Lackner<sup>1</sup>, G. Guthausen<sup>1</sup>

<sup>1</sup>Institut IWAR, Technische Universität Darmstadt, Germany

<sup>2</sup>Pro<sup>2</sup>NMR, Karlsruhe Institute of Technology, Germany

<sup>3</sup>Engler-Bunte-Institut, Karlsruhe Institute of Technology, Germany

## Motivation

Biofilms are of high interest in the context of food safety due to their ability to e.g. host pathogens. Therefore, infectious diseases are associated with biofilm formation on surfaces, such as food-contact surfaces. In water treatment, the mass transfer of disinfectants into the biofilm matrix [1, 2].



Simulation of dissolved oxygen concentration in biofilm [4]

## Biofilm Imaging



## Aims

- Study mass transfer in real biofilm structures to better understand the process using NMR diffusometry and magnetic resonance imaging (MRI):
  - biofilm imaging
  - diffusion coefficient

- Two different biofilm structures

## Measurements

- Exponential fit
- Gaussian distribution
- $D_{\text{app}}$  (signal amplitude = 90%)
- $D_{\text{app}}$  (center layer: scale of distribution)

Deeigal.  
inspired by  
CIRQUE DU SOLEIL

## Main

- ...
- ...
- ...



# @nTEK

## NMR innovation

Anvendt Teknologi has since 1998 been working persistently towards providing the best methods and equipment for characterising heterogeneous systems using the low field NMR measurement technique.

## Our services:

- Low field NMR instrumentation
- Our unique spoiler recovery (SR) - NMR experimental set-up for fast acquisition of Diffusion, T1 and/or T2
- Fat and moisture content determination in food stuff
- Characterisation of emulsions
- Customer based applications

We don't have to claim to be producing the best there are, our customers know it.



# @nTEK

## Anahe

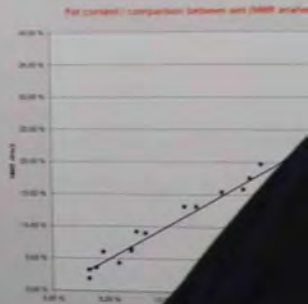
A robust application for analysis of

- Does not extract more information than experimental data
- Quantitatively robust

The kernels:

$$I = \sum_{i,j} I_{i,j} e^{-\frac{t}{T_{i,j}}} (1 - e^{-\frac{t}{T_{i,j}}}) \quad , \quad I = \sum_{i,j} I_{i,j}$$

Where  $T_x$  and  $T_y$  can be  $T_1$ ,  $T_2$  and/or



Comparison between a 1-dimensional method (





NEUMAG

NEUMAG



Low Field Nuclear

Mezuro 23-6000  
Quick and non-d  
Large probe (80



...China, working to  
...equally important  
...the industrial  
...the industrial

Model	Field (T)	Probe	Accessories
MEZURO 23-6000	0.23	80mm	...
MEZURO 23-6000	0.23	100mm	...
MEZURO 23-6000	0.23	125mm	...
MEZURO 23-6000	0.23	150mm	...
MEZURO 23-6000	0.23	200mm	...
MEZURO 23-6000	0.23	250mm	...
MEZURO 23-6000	0.23	300mm	...
MEZURO 23-6000	0.23	400mm	...
MEZURO 23-6000	0.23	500mm	...
MEZURO 23-6000	0.23	600mm	...
MEZURO 23-6000	0.23	800mm	...
MEZURO 23-6000	0.23	1000mm	...

NEUMAG/NEUMAG-MA  
100 Years of Innovation



### Classification of Italian Vinegar by Foodomics Approach

Abstract: Vinegar is a complex mixture of organic acids, esters, and other compounds. The foodomics approach allows for a comprehensive analysis of the chemical composition of Italian vinegars. This study aims to classify different types of Italian vinegars based on their chemical profiles. The results show that there are significant differences in the chemical composition of different types of Italian vinegars, which can be used to identify and classify them.

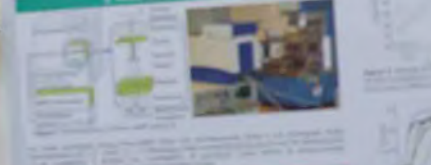


### Combining Crystallization Kinetics and Rheological Properties Developed Low-Fat Shave-Off Creams

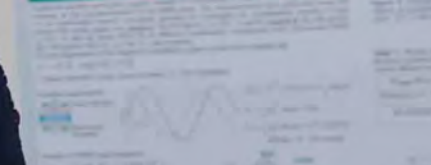
Abstract: Low-fat shave-off creams are a popular personal care product. The development of these creams requires a deep understanding of the crystallization kinetics and rheological properties of the ingredients. This study aims to combine these two aspects to develop low-fat shave-off creams with improved performance.



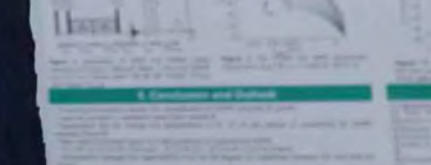
### Crystallization Kinetics and Rheological Properties



### Crystallization Kinetics and Rheological Properties



### Crystallization Kinetics and Rheological Properties



### Crystallization Kinetics and Rheological Properties



### Crystallization Kinetics and Rheological Properties





nated  
l.  
in

SPINLOCK

KIT

Pinlock  
SPINLOCK

Pinlock  
SPINLOCK

SPINLOCK  
SLR-2111





K

1998 been  
providing the  
for character-  
using the low  
nique.

on  
(SR) - NMR  
acquisition of  
etermination

We don't have to  
claim to be producing  
the best there is,  
our customers just  
know it!

.no

@nTEK

### Anahess

A robust application for analysis of 2-dimensional NMR data

- Does not extract more information than provided in the experimental data
- Quantitatively robust

The kernels:

$$T = \sum_i |c_i|^2 (t_i - \bar{t})^2 + \sum_j |d_j|^2 (t_j - \bar{t})^2$$

Where  $T_1$  and  $T_2$  can be  $T_1$ ,  $T_2$



### Low Field Nuclear Magnetic Resonance — for food analysis

MesoMR23-060H-1

- Quick and non-destructive test
- Large prebe (Ø60mm) satisfies different samples

#### Food safety

- Detect food pathogens sensitive
- Detecting "G" and other factors
- Locality identification

#### Nutrition

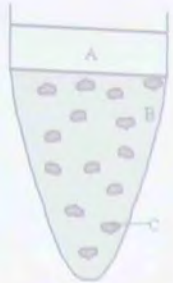


## Different preparations – different properties

- Standard Whey Protein Isolate (WPI) MPs
- MPs with altered water-binding capacity
  - treatment with dithiothreitol (DTT), N-ethylmaleimide (NEM), genipin, HCl, transglutaminase (Tgase), pH
  - Cold gelation (high swelling capacity, reduced crosslinks)
- Different sources: soy and pea protein isolates, lupin protein concentrate, vital wheat gluten



# Water distribution



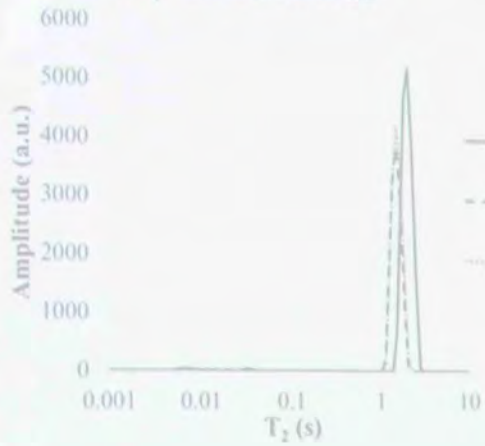
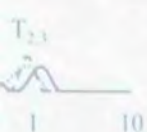
## supernatants

- ST MPs
- - DTT MPs
- ... pH MPs

Amplitude (a.u.)

$T_2$  (s)

- ST MPs
- - DTT MPs
- ... pH MPs









Baden-Württemberg  
REGIERUNGSPRÄSIDIUM



Baden-Württemberg  
REGIERUNGSPRÄSIDIUM







Notausgang

Notausgang

Baden-Württemberg  
REGIERUNGSPRÄSIDIUM





mbe  
KARLSRU

CTA



Baden-Württemberg  
REGIONALGRUPE



# ACKNOWLEDGEMENTS

Sophie Hong  
John van Duynhoven  
Alessia Ermacora  
Ewoud van Velzen

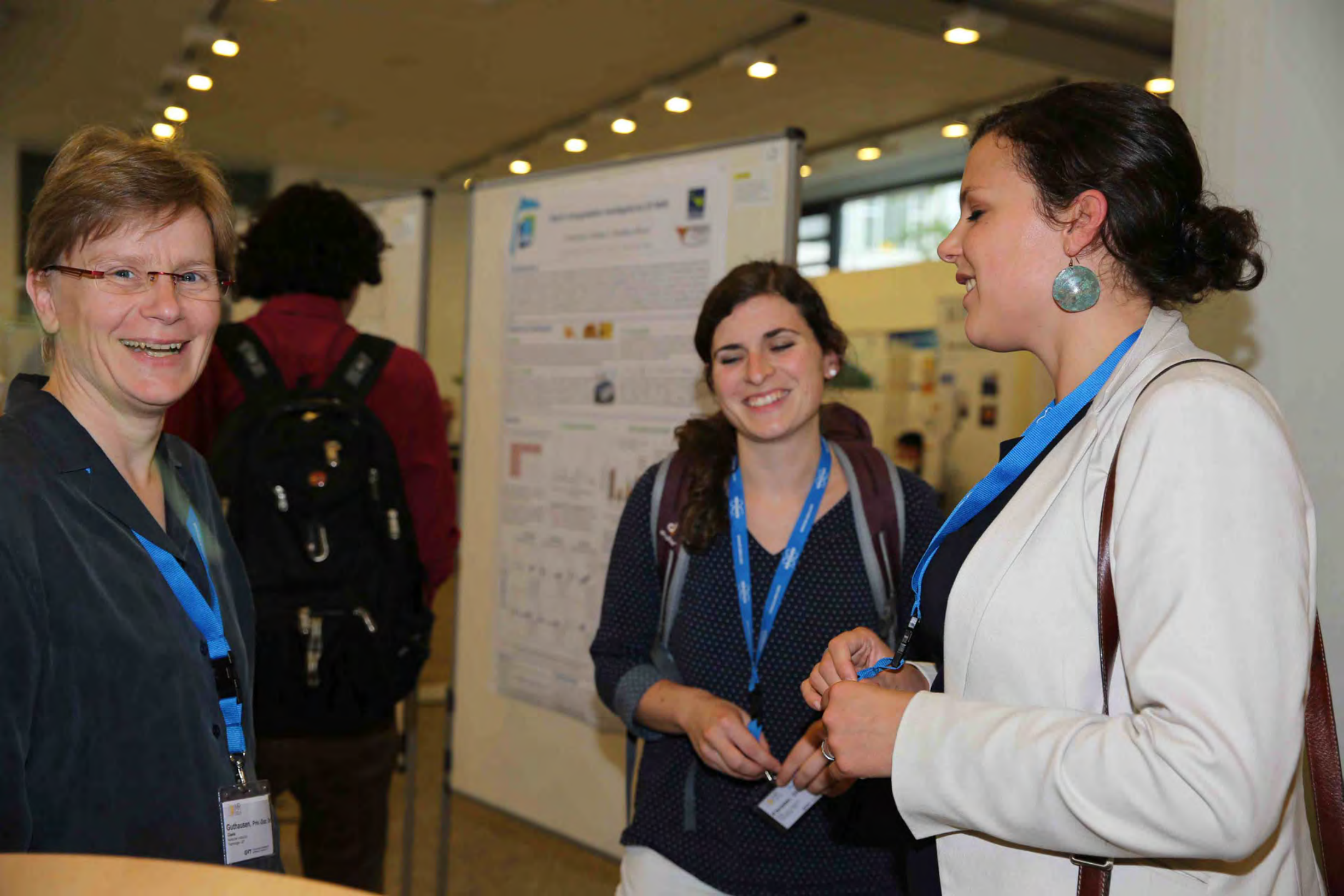














Grüßmann, Prof. Dr. ...

Organizing Team  
Förster, Dipl.-Ing.

Organizing Team  
Amdt, Dipl.-Ing.



White ID badge on a blue lanyard.

Herrling, Dr.-Ing  
ID badge on a blue lanyard.

*muy secreto que lo  
respira respira  
hacelo! hacer hasta  
muy secreto que  
no se puede*







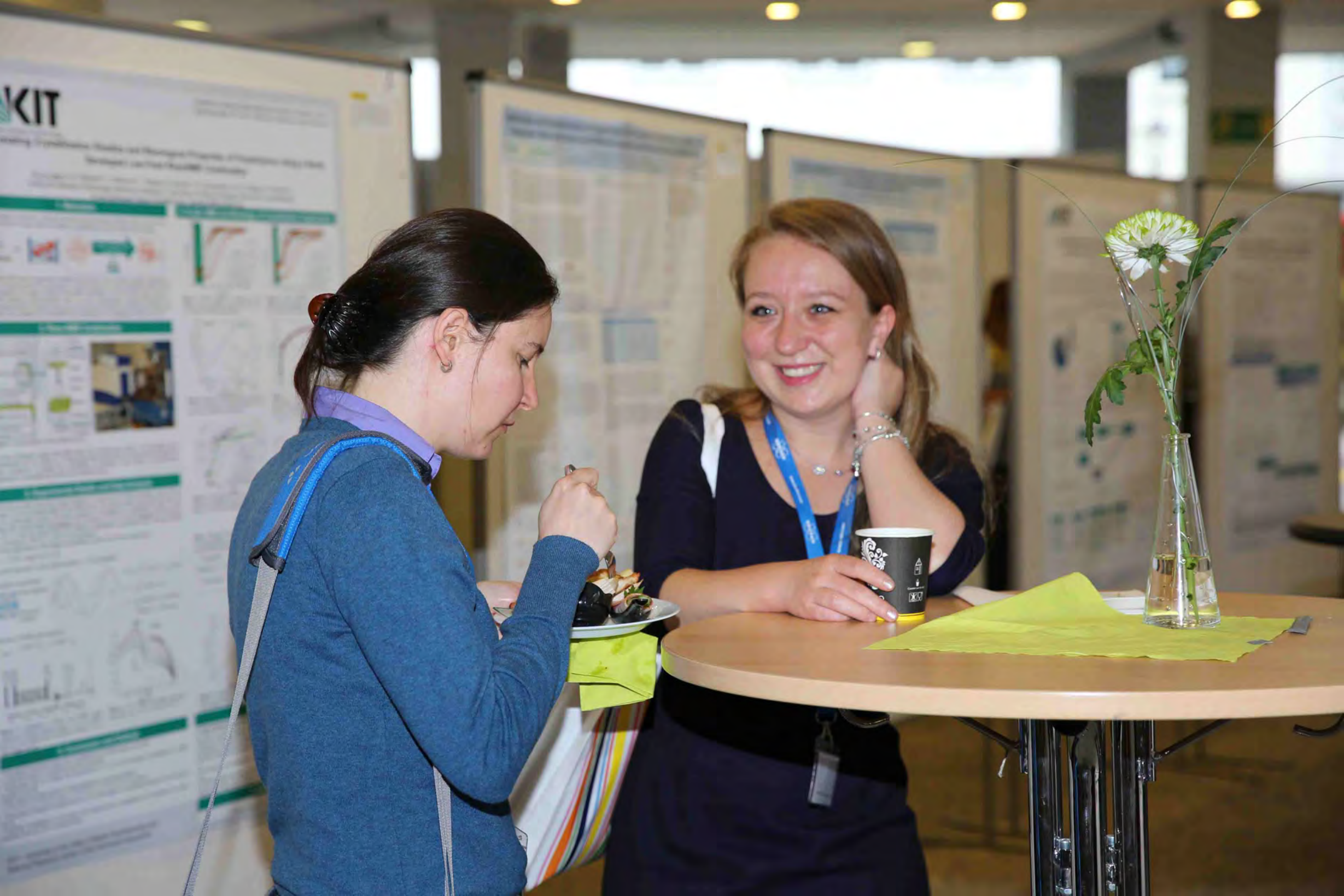


MSC  
PILA  
Trimigno,  
Brescia



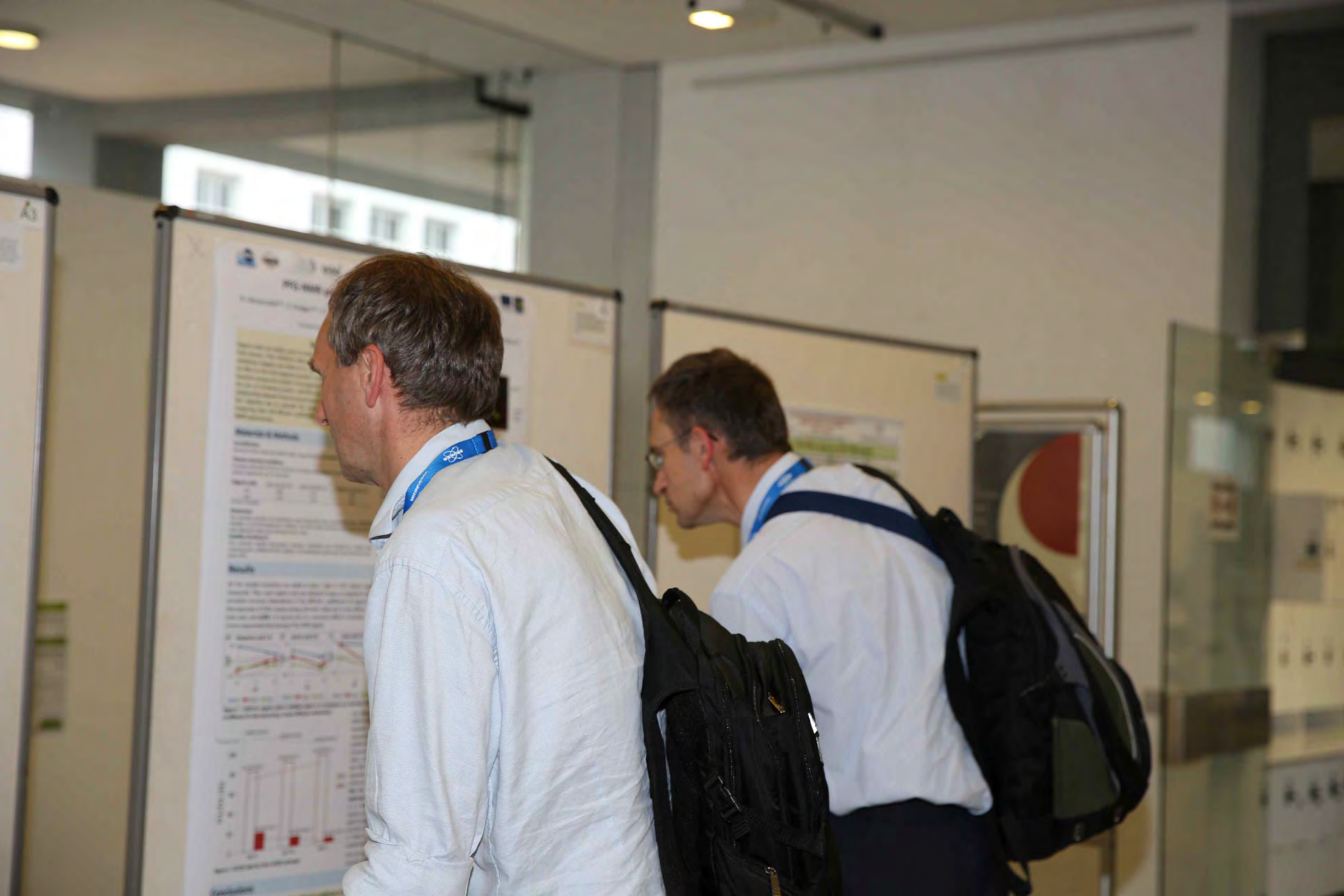














...  
...  
...  
...  
...

Wine analysis through the application of 3DSS  
robotic systems technology

Dr. Matthias ...  
Prof. Dr. ...



























Capozzi, Prof. Dr.

Mannina, Prof. Dr.

Capozzi, Prof. Dr.









MR  
2016

**Morris, Dr.**  
Robert  
Nottingham Trent University

GVT Psychologie Gesellschaft  
Verhaltensforschung e.V.













