



functional foods forum

# Collaboration between science and artisan knowledge

- new perspectives for product development

*Non-Wood Forest Products, Health and Well-being*– conference

Hotel Korpilampi  
12.-13.11.2013

Anu Hopia  
Prof. food development



TURUN YLIOPISTO  
UNIVERSITY OF TURKU

# How much oil does one egg yolk emulsify?





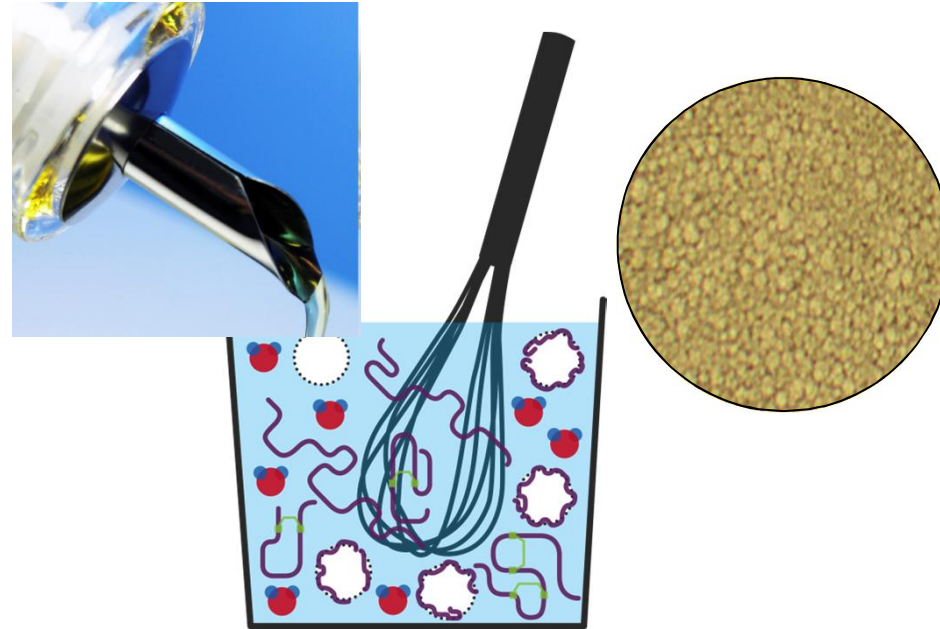
# Example - Mayonnaise



## Gastronomic recipe

- 1 egg yolk
- Wine vinegar
- Mustard
- 1-1 ½ dl oil

Mix yolk, vinegar and mustard. Wisk the oil vigorously into the mixture until it thickens.



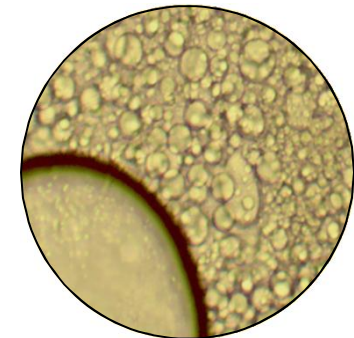
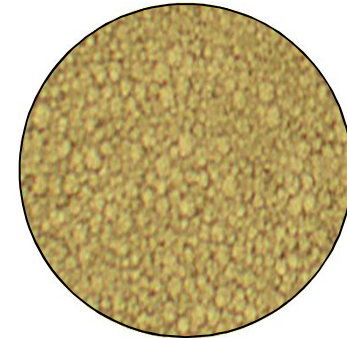
## Scientific recipe

- Oil
- Water
- Emulsifying agent

- Oils is emulsified into small droplets into the water phase
- Emulsifying agent surrounds oil droplets and keep the phases separated.



# ”formula”



## Gastronomic

”1 yolk emulsify max 3 dl oil”

## Scientific formula

” $n \times \text{OIL} + s \times \text{EMULSIFYING AGENT} + m \times \text{WATER} = z \times \text{EMULSION}$ ”





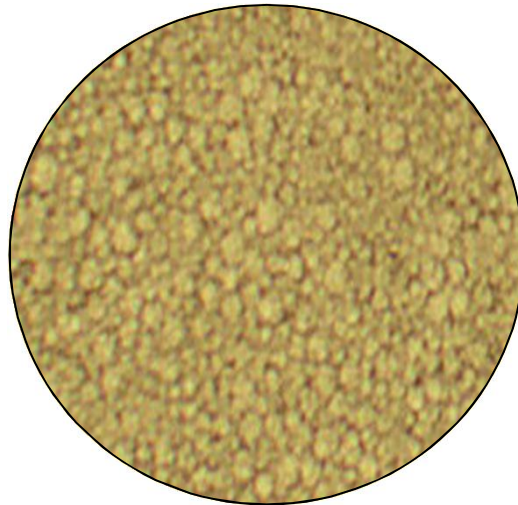
# Example - Mayonnaise



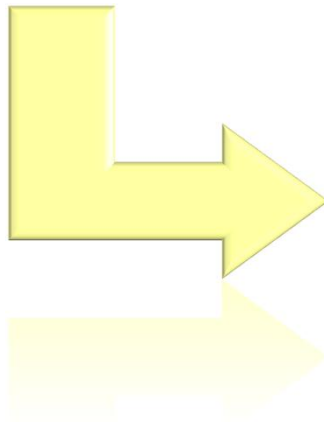
2g yolk + 18 g water emulsify 7 dl oil = 1 yolk can  
emulsify 7 l oil



# But the new "mayonnaise" did not taste good...



- 7 l oil
- 1 yolk
- 2 dl water



Place for new  
innovations

INNOVATIONS

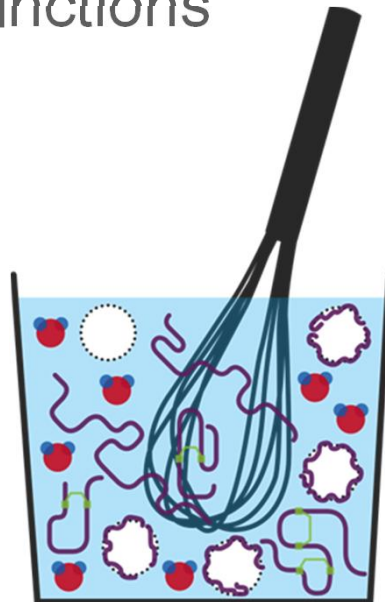




# Two separate enterprises

## Science

- The “Making of Knowledge”
- Aim is to understand, how world functions



## Craftmanship

- The “Making of Objects”
- Aim is to make beautiful, well functioning things





# Lessons to be learned

## About methodology

- Investigating phenomena
- Formulation, testing, and modification of hypotheses
- Measuring
- Systematic observations
- Specific principles of reasoning

## About arts and crafts

- Practicing
- Collecting observations
- Generating questions
- Persevering
- Trial-and-error problem solving

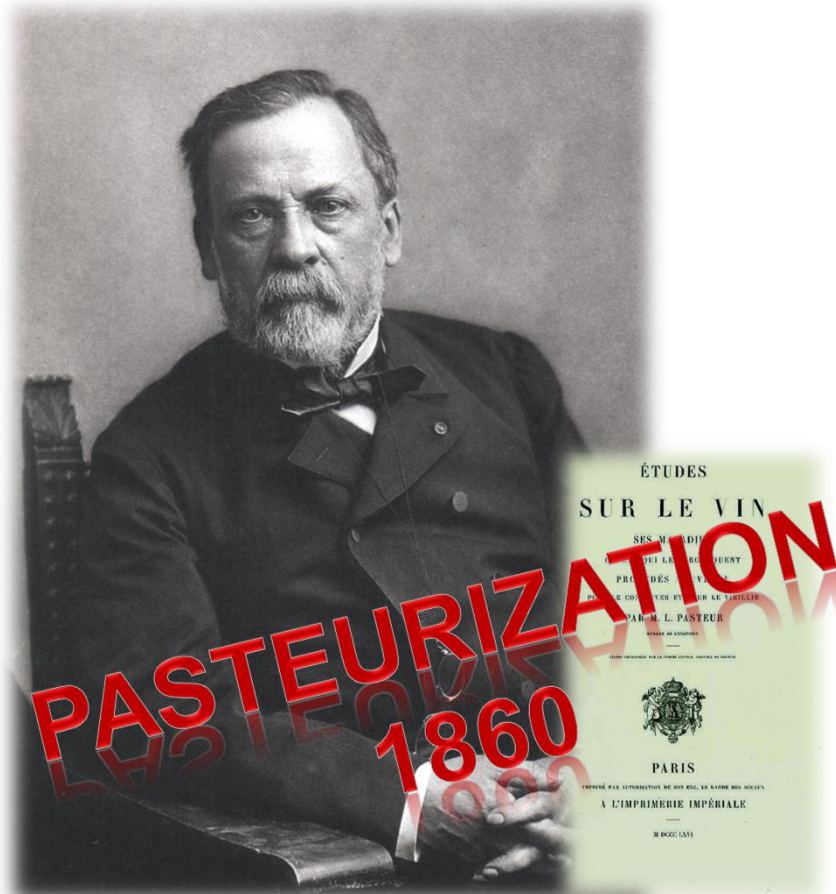




# Food and science and craftsmanship

Louis Pasteur (1822-1895)

Nicolas Appert (1749 –1841)





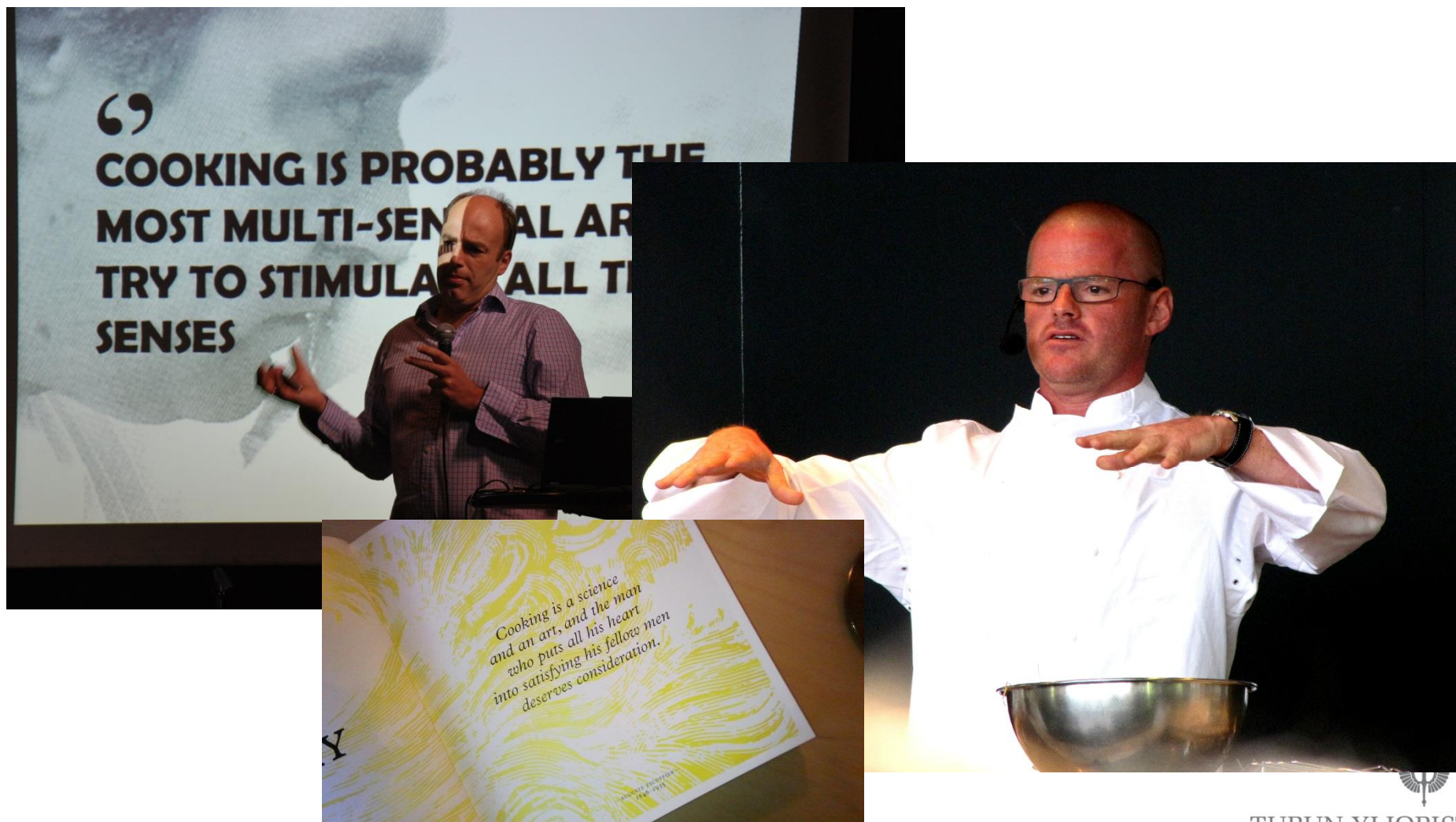
# Molecular gastronomy

- New scientific discipline since 1988
- Science of good food
- New dialogue between scientists and craftsmen (chefs)
- Outcomes...





# Culinary innovations





# Molecular Gastronomy: A New Era

Chem. Rev. XXXX, XXX, 000-000

Peter Barham,<sup>†‡</sup> Leif H. Skibsted,<sup>‡</sup> Wendy  
Pie



Food Quality and Preference 24 (2012) 201–204

Contents lists available at SciVerse ScienceDirect

## Food Quality and Preference

journal homepage: [www.elsevier.com/locate/foodqual](http://www.elsevier.com/locate/foodqual)



Short Communication

### A bittersweet symphony: Systematically modulating the taste of food by changing the sonic properties of the soundtrack playing in the background

Anne-Sylvie Crisinel<sup>a,\*</sup>, Stefan Cosser<sup>b</sup>, Scott King<sup>c</sup>, Russ Jones<sup>c</sup>, James Petrie<sup>b</sup>, Charles Spence<sup>a</sup>

<sup>a</sup>Crossmodal Research Laboratory, Department of Experimental Psychology, Oxford University, Oxford, UK  
<sup>b</sup>The Fat Duck Experimental Kitchen, Bray, UK  
<sup>c</sup>Condiment Junkie, London, UK

#### ARTICLE INFO

Article history:

#### ABSTRACT

We report an experiment designed to investigate the consequences of-



# Education

## PROGRAMS WITH ENHANCED DIALOGUE WITH GASTRONOMY

- University of Parma
  - Gastronomic sciences (MSc, BSc)
- University of Copenhagen
  - Food innovation and health (MSc, BSc)
- AGRO Paric Tech/Dublin Institute of Technology/University of Naples/University of Lund
  - Erasmus Mundus Master's in Food Innovation and Product Design
  - For PhD students
- Institut Paul Bocuse's Food and Hospitality Research Centre, Ecully, France
  - Combination of food science and nutrition with knowledge in culinary art, products presentation and gastronomy must certainly be actors to help nutritionists and scientists to implement in a practical point of view the nutritional recommendations in the general population, with a central question: how to change «eating» towards healthy, tasty food by changing food offer?
- University of Washington & US Research Chef Association





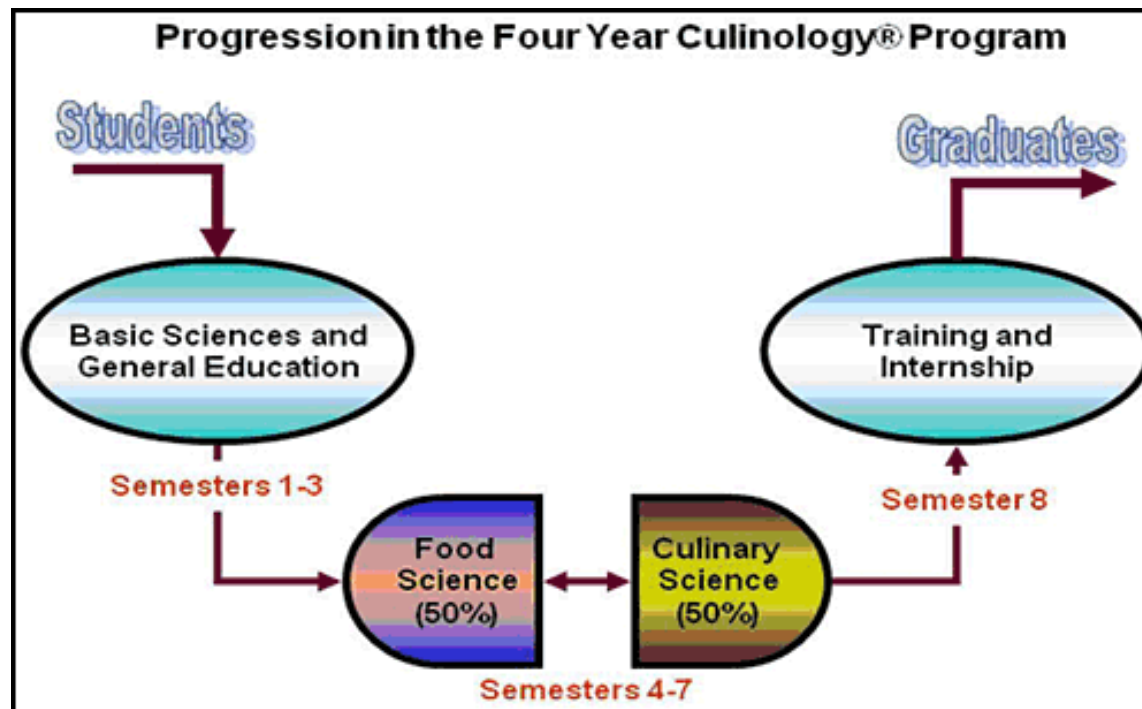
# ”Culinology”

- Interphase between food science, gastronomy and food industry
- In US registered trademark of Research Chef Association, US (founded 1996)
  - Culinology® is field involving a blend of culinary arts and the science of food
  - The Culinology® Option of the Bachelor of Science in Food and Nutritional Sciences is an option that includes studies from culinary sciences, food chemistry, food microbiology, sensory science, food processing, foods, product development and food service management.
  - Hands-on experience both in culinary arts and research.
  - At the completion of the program, students have earned a Bachelor of Science in Food and Nutritional Sciences.
- NCE Culinology Institute in Stavanger, Norway
  - Joint venture between food industry, culinary institute and research organisations
- Institut Paul Bocuse’s Food and Hospitality Research Centre, Ecully, France
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# Combination of culinary art and food science

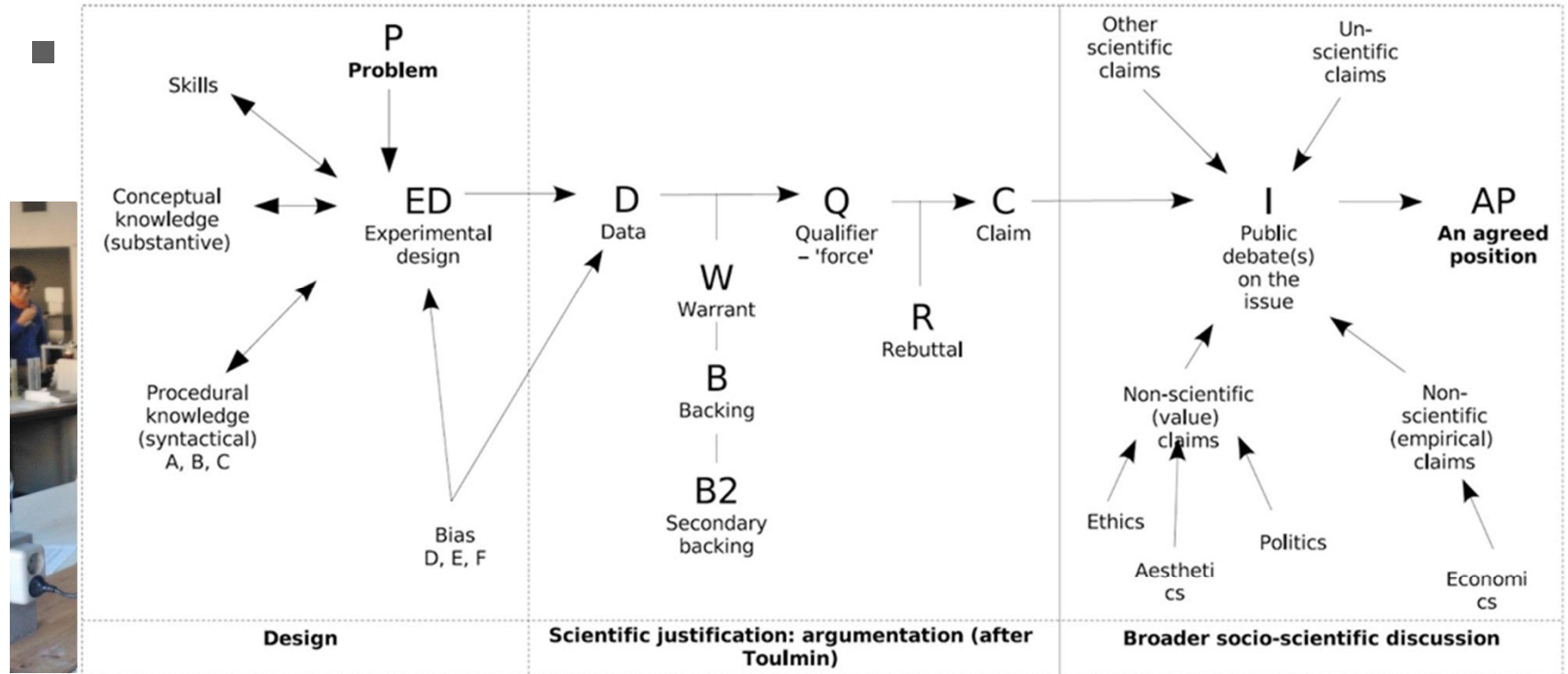


Source: Research Chefs Association





# Life long learning



Looking forward



Looking back



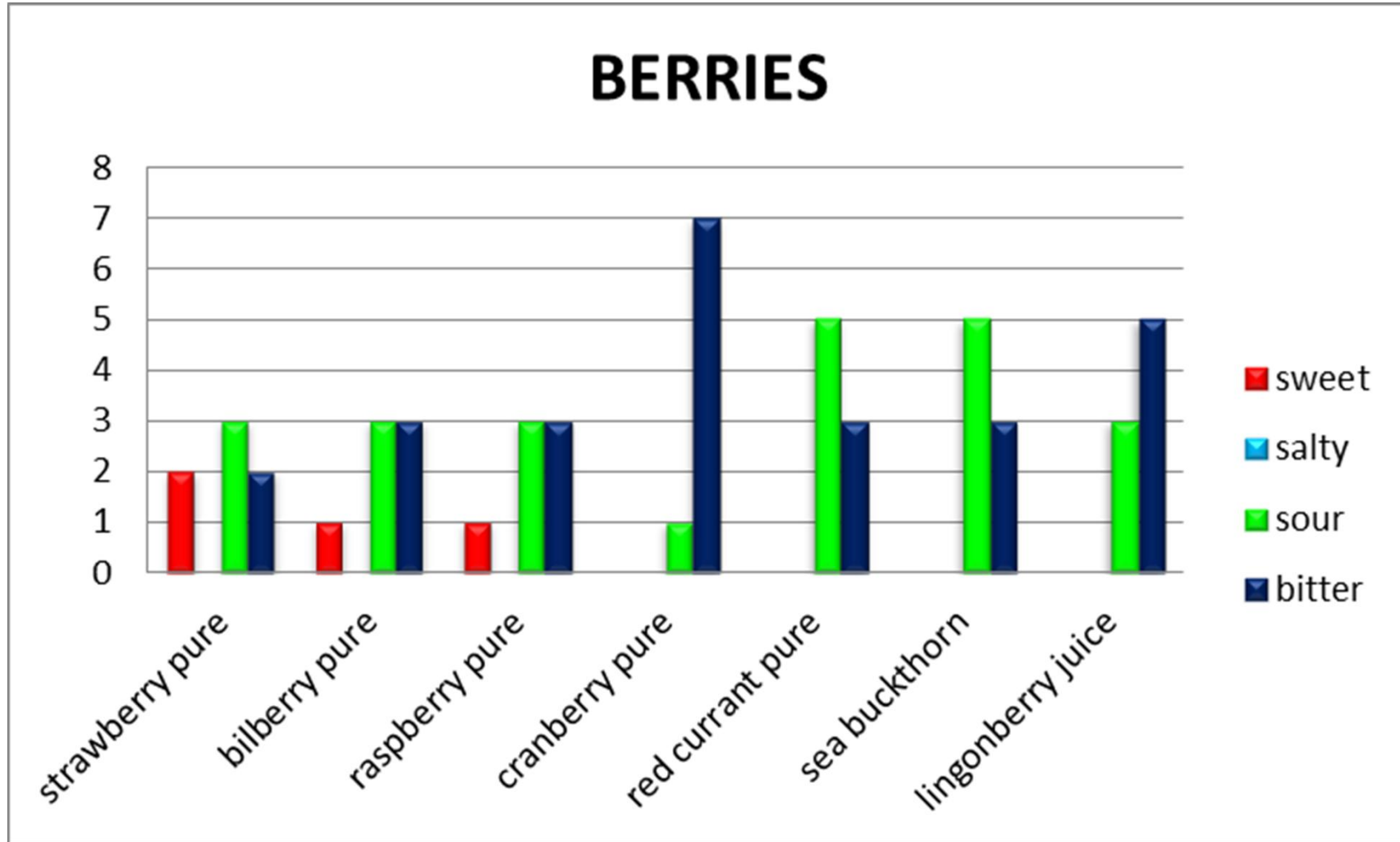


# Research and innovation projects case - berries

- Taste and health of berries 2008
  - Funded by Finnish Innovation Funds SITRA
  - Participants
    - 6 food companies (micro-SME-large)
    - 1 culinary school
    - 1 university
    - Finnish Culinary Team 2008
  - 3 workshops and 1 research project based on business needs
- Lingonberry Superfruit 2009
  - Flavor of lingonberry and its modification options
  - Effect of structure on berry flavor
  - Functional Foods Forum/Mari Sandell, Saara Lunden, Anu Hopia
- Fermented berry products
  - Functional Foods Forum/VTT joint RDI plan
  - Company interviews on-going



# Which taste dominates in berries?



# How do we get people eat more berries?



**THANK YOU!**

