**inSPIRe møde for søjle 1**

Torsdag den 8. marts 2012, kl. 10 til 15
DMRI Teknologisk Institut, Maglegaardsvej 2, 4000 Roskilde

Hospital Food Service/FoodServInSPIRe Projektets overordnede mål og indhold

Bent Egberg Mikkelsen, Kwabena Ofei, Dwi Budingsari, Dorte Ruge, Janice M. Sorenson, Tina Beermann

Abstract: Danish hospital foodservice has a considerable nutritional and environmental impact. This service is responsible for the production of 200,000 meals that are served to patients, relatives and staff every day. Besides suffering form widespread undernutrition Danish hospitalfood service units also suffer from considerable waste of food and evidence shows that food waste in hospitals food service is 40- 45% resulting in a total waste of $4*10^7$ kg of food waste/year. This presentation reports from the FoodServInSPIRe project – part of the InSPIRe program and present the overall set up of the project including its industrial partners and its case/intervention partner - Aalborg Hospital.. The intervention will contain a local food sourcing strategy that will contribute to increase patient perception and introduce a ICT based device for monitoring food waste. The intervention will use data on patient preferences and food data to predict and forecast demand precisely thereby contributing to decreasing waste and decrease the environmental impact. The intervention will integrate existing patient, food and processing data into one ICT system, through real-time hospital food flow monitoring.

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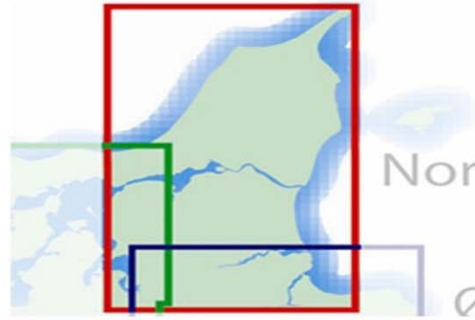
Organisation

Bent Egberg Mikkelsen	Henrik Højgaard Rasmussen	Mette Holst	Pernille Nørbak	AgroTech: Jeanette Eis	Diana Hierbæk Gjellebøl	ICT students
Steering committee (Chairman)	Steering committee	Steering committee	Kitchen leader	InSPIRe GTS Collaborator	Freelance	MSc stud.

PL

Tina Beermann	Janice M Sorenson, Post Doc
Acting project manager	

Phd Students

Kwabena Titi Ofei	Dwi Budiningsari
PhD stud. Food waste	PhD stud. Clinical Nutr.

Dorte Ruge, PhD (local food)

FoodServinSPIRe:

Integrated Modelling of Hospital Food Service Production Chains

- **Problem:**
  - Betydeligt madspild
  - Risiko for underernæring
  - Udfordrende rammer
  - Trial & error

- **Potentiale:** Sygehuse har store mængder data om
  - Patienter
  - Fødevarer
  - Processer

- **Løsning?:** Samkøring, systematisering, modellering og optimering af data mhp strammere styring af logistik

SME collaborators

- Lantmännen
- Himmerlandskød A/S*
- Meals4life v/Niels Rørdam Holm*
- Bent Brandt A/S*
- Bageriet Aurion A/S*

- Aabybro Mejeri*
- Nordjysk Fødevare Netværk*
- Larsen Danish Seafood
- Rynkeby Food Service

(*Have signed the collaborative agreement.

Aims & objectives 1

- Investigate *patients' perceptions of hospital foodservice practices* regarding local food sourcing, production, and menus concepts; communication and interaction with the kitchen; and food ordering practices, especially as affecting their food intake (quantitative questionnaire study). These results will be applied in the development of strategies and tools used in the project.

- Investigate *current foodservice practices* on the wards and identify areas for improvement regarding food waste (observational study using semi-structured questionnaire).

- Identify and overcome barriers to integrating organic and local food products into the hospital foodservice production chain and establish a workable and sustainable *local food supply chain, production, and menu concepts*.

Aims & objectives 2

- Develop and validate an automated, ICT-based tool for real-time *monitoring of patient food intake and food waste* (e.g., plate waste) on the wards.

- Develop a *forecasting method for food ordering* by the wards based on patient characteristics with the best predictive value of food intake (e.g., demographics, NRS-2002, menu food preferences, portion size, personas, food intake, eating related symptoms, and 'patient food choice questionnaire' (Sorensen J. PhD)).

- To develop an ICT mobile tool to facilitate *hospital foodservice communication*, such as providing information about the menu, inputting patient characteristics for forecasting and ordering food on the wards.

- The developed strategies and tools will be applied in an *intervention study* and their effect on food waste and patient food intake will be assessed.

Methodology 1:

- *Patients' perceptions of hospital foodservice practices*: Current food service practice will be assessed from patients' perspectives based on their characteristics (age, gender, nutritional status, ethnic background) and perception of food served by the hospital, their food preferences, the weeks menu/food choices, portion size, and local food issues, using a structured quantitative questionnaire. (**Dwi**)

- *Current foodservice practices*: A baseline observational study will be conducted to explore the existing operations of the hospital food service in order to uncover the everyday realities and context within which the current practices occur. The hospital meal chain will be analysed systematically to quantify food waste using a structured approach which is based on the lean principles adapted to the food sector. Semi-structured questionnaires will be used to collect data from foodservice staff, ward assistants, and other personnel dealing with patient meal service. The questionnaire will be structured to capture applicable strategies to increase patient food intake and reduce food waste. (**Kwabena**)

Methodology 2:

- *Local food supply chain, production, and menu concepts*. A scoring system for defining 'local food' is being developed (e.g. local raw ingredients, organic, local business address, local marketing). Furthermore, the existing food business partners and the potential needs for new partners are being assessed using the scoring system. Strategies for overcoming barriers to local food sourcing in hospital food service (e.g., purchasing agreements, purchasing local foods on a pilot project project), will be explored and applied to establish a local food supply for application in pilot-testing of meal concepts and in the intervention study. In collaboration with the central kitchen, local food menu concepts will be developed in which the most suitable food products from the local suppliers will be used. In addition to local food sourcing, local meal production will allow patients a closer connection and involvement in their meals, which could be facilitated by using satellite kitchens. (**Dorte**)

- M*onitoring patient food intake and food waste*: An automated ICT-based tool for real time monitoring patient food intake and food waste will be developed in collaboration with a company (e.g., Mettler Toledo is being considered as a potential collaborator).** Such a tool could consist of four main components: the video camera for taking digital photograph, the weighing scale, scanner readable and telephone cards to transmit both the digital image and weight of the food before and after eating to the main server where data can be retrieved and analysed. The data will be transmitted based on the real time principles. The right position to fix the camera to capture accurate three dimension photograph of meals will be determined after several trial and adjustment of the camera have been made. The RFID system will be used to identify patients. Each patient will have a scanner readable band to register personal data against food measurement and digital images.
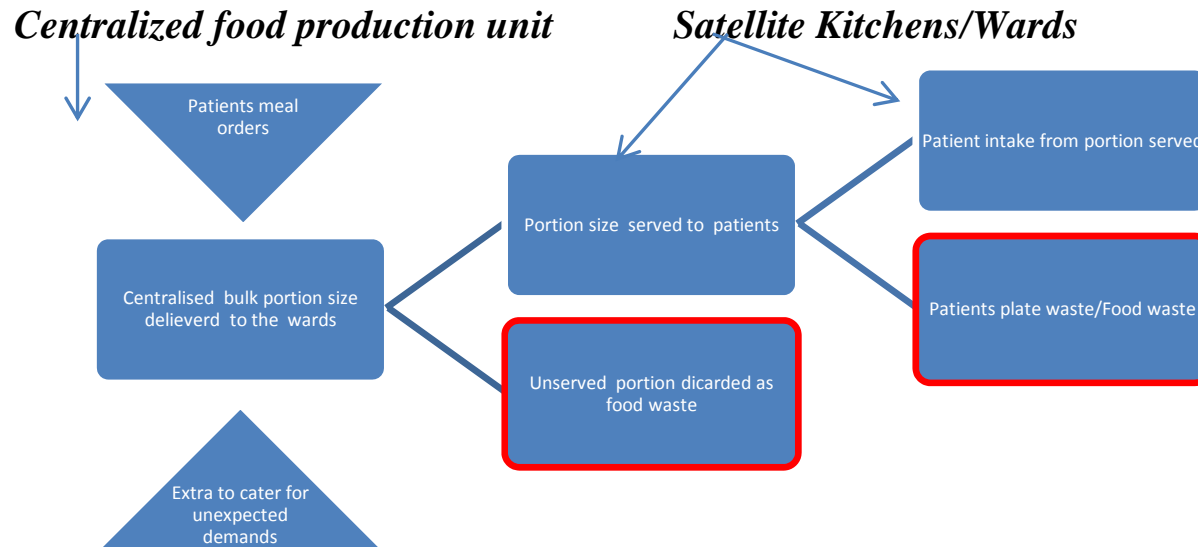
Methodology 3:

- A validation study will be conducted to compare the newly developed tool for monitoring food intake to the 24-hour dietary record used in current practice, and with 24-hour weighed food records by the researcher as a gold standard to measure dietary protein and energy intake during patients' hospital stay. (**Dwi**)

- *Forecasting method for food ordering*: Concurrently with collecting food intake data of patient in the validation study of monitoring food intake, information on their characteristics at admission to hospital (e.g., demographics, NRS-2002, menu food preferences, portion size, personas, food intake, eating related symptoms, and 'patient food choice questionnaire' (Sorensen J. PhD)) will also be collected. The forecasting model will be developed based on the patient characteristics with the best predictive value of food intake. Data will consist of measurements from same day of the menu cycle and the same day of the week of patient meals served and food waste. The purpose of these two measurements will provide an opportunity to recommend the mode of data collection for optimum forecasting for the hospital foodservice. Simple mathematical time-series techniques such as the naïve models, moving averages, and exponential smoothing model will be applied to the data generated through computer program package. The models will be evaluated and compared using the mean absolute deviation and mean squared error to determine the best forecasting model for future patient meal demand and food waste expected to be generate. (**Kwabena**)

Methodology 4:

- *Hospital foodservice* communication: A user friendly mobile device with dietary interface and functions on the basis of interactive communication media which will permit patients to, e.g., provide information on themselves relevant to forecasting of food orders, their food preferences, select their own meal based on the daily menu list day, and provide feedback to the kitchen. The hospital menu cycle will be uploaded on a web station connected to a mobile device in the wards where patients can view and order meals personally or assisted by ward assistant. Alternatively patient can get access to same information and make order on personal mobile devices, such as telephone, tablets or laptop computers once connected to the link with a valid patient password. The device will display all the menu options as well as brief stories on localness and stories behind the food ingredient used in the meal preparation. Patient can make food selection and the portion size deemed to be appropriate to them by pressing key pads assigned to each food choice. The selection will be instantly transmitted and reflected on a server/foodservice computer, based on the real time data processing mechanism, which will tabulate patients' selection for the daily tally for food production purposes. (**MSc students from CMI, AAU**)**

- *Intervention study*: The combined effect of the developed strategies and tools on food waste and patient food intake will be assessed in an uncontrolled before and after study. (**Dwi** (food intake) & **Kwabena** (food waste))

Subproject: 1 Reducing Food waste

- Analysis of the centralized meal system in relation to meal ordering, forecasting and portioning of meals for wards and food waste.

Centralized food production unit　　　　*Satellite Kitchens/Wards*

Patients meal orders

Centralised bulk portion size delieverd to the wards

Extra to cater for unexpected demands

Portion size served to patients

Unserved portion dicarded as food waste

Patient intake from portion served

Patients plate waste/Food waste

Kwabena Ofei

Hypothesis: Patient acceptability and use of the tool will improve patient meal ordering and reduce food waste

Meal ordering tool components using mobile platform:

- Patient Profile and Preferences
- Hospital Menu Cycle
- Information on Local Food Sources
- Interactive Dietary Interface
- Patients Meal Selection and Portion Size
- Patient Feedback on Plate Waste
- Digital Photo of Pre/Post Patient Plate Content

Kwabena Ofei

Hypothesis: The developed automated measurement tool is accurate for patients portion size and plate waste assessment

Automated tool components:

- Video Cameras

- Digital Weighing Scales

- Computer

- Patients Identifiers(RFID, barcodes)

- Real time monitoring of Patient Plate Waste

Kwabena Ofei

Semi automatic food & waste measuring
cooperation with Mettler Toledo

Interfacing foodcomp and EPJ data
cooperation with Anova data
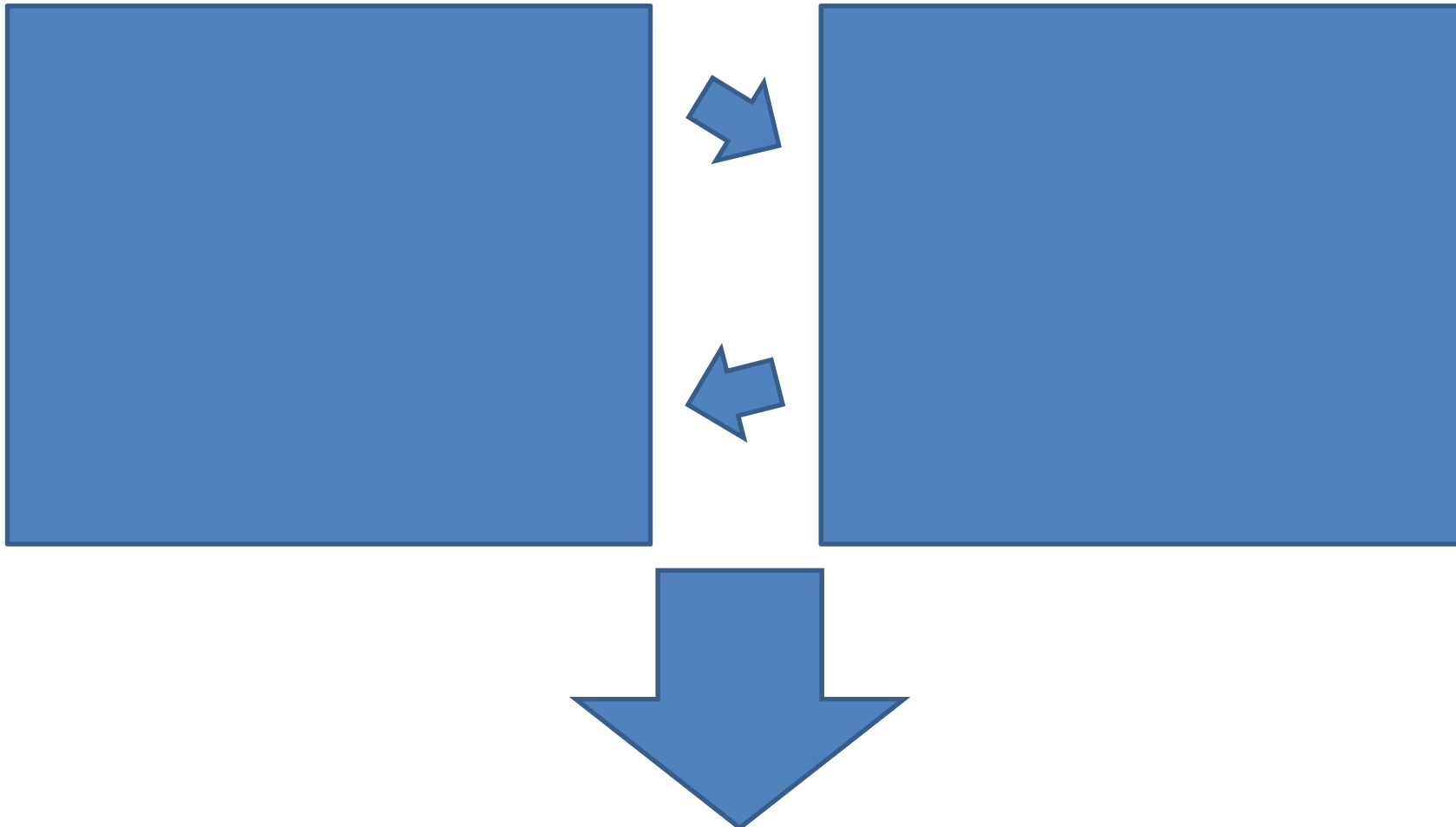
Sub projekt 2: Lokale madstrategier

- Udarbejdelse af autoritativt notat
- Empiri: Aalborg (patient, ansat, gæst) + Hjørring. Interviews, lovgrundlag, regelsæt etc
- Temadag om off. fødevareindkøb og lokalitet sommer 2012 (med AgroTech)
- Konferencebidrag: IFSA 2012, FoodScape PhD kursus (LMC)
- Udvikling af forsyningskæde med AAS patienthotel i samarbejde med leverandører

Dorte Ruge

Subproject 3: Intervention study

- An innovative method to **monitor** dietary intake during hospital stay of patients can improve patients' motivation to eat and support nutrition therapy by dietitians.

- To provide better hospital food in term of **local and experience rich foods** to improve patients' nutritional intake.

- Investigate **beneficial effects of proper food service** and nutritional care in hospitals on the recovery of patients and their quality of life.

Dwi Budingsari

Subproject 3: Intervention study

To compare the new (meal ordering/forecasting) system to the old system for:

- *Effectiveness in Food waste reduction*
- *Portion size accuracy*
- *Patient plate waste*
- Indepent Variable: Patients using new system
- Outcome variables: Food waste (Bulk left over & Plate waste)

Kwabena Ofei

Subprojekt 4: Forecasting process parameters

- In cooperation with
- DTU food
- Viffos/ e-smiley

Hvordan forsker vi i FoodServInSPIRe?

The mode of working in FoodServInSPIRe

- Our vision: a changing *Local Public Food Geography* might be able to add value for

- Local food business
- Local foodscapes/welfare provision

- That's a win win situation

The mode of working in FoodServInSPIRe
Two important anchorages

- Communities of Practice (COP)
- Knowledge Brokering

The mode of working in FoodServInSPIRe
Knowledge brokering

The link between

- To know

- To do

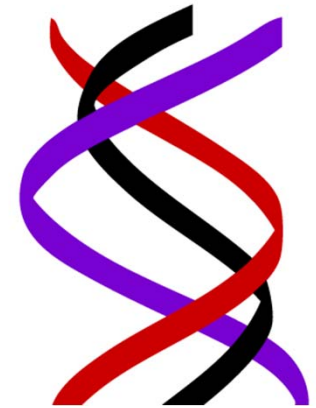# The mode of working in FoodServInSPIRe

COP's are networks of

- "people who are together on a common idea and who share a common vision to practice this idea and thereby become more competent."

Jean Lave & Etienne Wenger

The mode of working in FoodServInSPIRe Communities of Practice (COP)

- Field Learning. Situated in Settings & Foodscapes
- Cross disciplinary learning
- Learning w/o formal curricula
- Learning by self determination (SDT)
- Learning through knowledge brokering

- Output: Adapting public needs and commercial supply using research as a catalyst

The mode of working in FoodServInSPIRe
Other communities of Practice

- ## SPIR

- Svendborg

- Roskilde

- Bornholm
  SoL.aau.dk

Network & outreach activities

- A *seminar on application of local food* in the FoodServInSPIRe project will be held in the beginning of 2012. Key members of the research team and existing and potential collaborators will be invited. The scoring system for defining 'local food' will be presented and potential food products for the local food companies as well as practical considerations for participating in the study and supplying local food will be discussed.

- ** A *seminar on application of ICT* in the FoodServInSPIRe project will be held in the beginning of 2012. Key members of the research team and existing and potential collaborators with interests and competencies in ICT will be invited.

FoodServInSPIRe website
foodservinspire.aau.dk

AALBORG UNIVERSITET

○ Personer ○ Websider

Søg ▶

FOODservINSPIRe

Nye Sygehuse - nye madtraditioner
Megabyggerier er en oplagt mulighed for at gentænke køkkenet, maden og spisningen og opnå mindre madspild og bedre ernæring

Baggrund for projektet
Danske sygehuse lider under et meget stort madspild og underernæring er udbredt blandt patienter. Underernærede patienter 50% dyrere end almindelige patienter på grund af komplikationer (Rasmussen 2006). Komplikationer omfatter svækkelse af immunforsvaret, infektioner, dårligere sårheling, øget risiko for liggesår, langsom mobilisering, nedsat respirationsevne samt ringere effekt af genoptræning (Sundhedsstyrelsen 2003). Der produceres dagligt op mod 100,000 måltider til en værdi af 1 milliard kroner årligt ikke bare til patienter men tillige til pårørende og personale på de danske sygehuse. En betydelig del af denne mad ender imidlertid ikke som ernæring men som madspild. Samtidig er uhensigtsmæssige spisemønstre som følger af skiftende arbejdstider og steder et betydeligt problem for de ansatte.
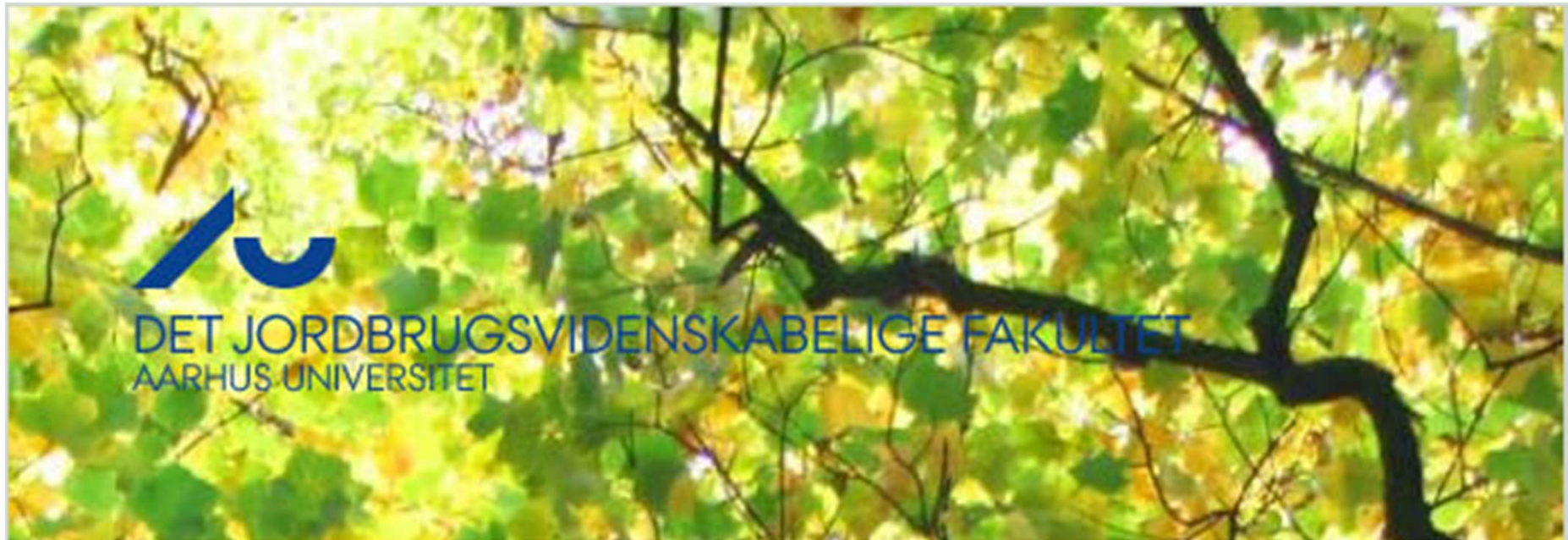
FORSIDE FOODSERVINSPIRE

OM SPIR

SAMARBEJDSPARTNERE

KONTAKT

IN ENGLISH

Workshop on Local Public Food
MTT Agrifood Research (SF) & MENU- AAUK-MENU

DET JORDBRUGSVIDENSKABELIGE FAKULTET
AARHUS UNIVERSITET

Call for paper abstracts for The 10th European IFSA Symposium, 1-4 July 2012 in Aarhus, Denmark

Producing and reproducing farming systems: New modes of organisation for sustainable food systems of tomorrow

Download a pdf-version of the call for paper abstracts

PhD course on public local food

Konference
Madspild i storkøkkener – årsager og strategier

Velkomst:

Mad spild – en skjult ressource? Ida Auken, Miljøminister, tbc

Hvorfor og hvad kan vi gøre?

Food waste in large scale kitchens – sources & strategies. Professor Peter Williams, University of Wollonggong, Australien (foredrag på engelsk)

Madspild I storkøkkener – tal, årsager & interventioner, Bent E. Mikkelsen

Madspild i udespisningen – foreløbige resultater fra AgroTech udviklingskontrakt arbejde. Johanne Sønderlund Birn

Fakta, strategi og fødevarementalitet bag madspild. Birgitte Escherich. Kostkompagniet.

Case studier fra sygehus og centralkøkken

Case studie 1. Madspild i de kommunale køkken – sådan kan de gribes an. Asta Poulsen, Hjortespring Central køkken, tbc

Case studie 2. Madspild i sygehus køkkenet – sådan kan de gribes an. Pernille Nørbak, Aalborg Sygehus Køkken, tbc (Jørgen Wirum, NIRAS) eller Bruno Nielsen Servicechef, Hjørring, tbc

Case studie 3. Madspild i sygehus køkkenet – sådan kan det gribes an. Diana Hierbæk Gjellebøl, Rigshospitalet, (billeder RH, veje, personligt ansvar på afdeling)

FoodServInSPIRe
Better food at hospital

Konference
Madspild i storkøkkener – årsager og strategier

- **Strategier**
- Monitorering af madspild - forretnings og velfærdsteknologiske muligheder. Karen Haman, IFAU
- How can ICT based monitorering be used in forecasting food demand, Kwabena Ofei, PhD student AAU-MENU
- Madspild på hospital – hvad kan FoodServInSPIR projektet bidrage med. Janice M Sorenson/Tina Beerman tbc, Aalborg Sygehus
- Hvordan får vi sat madspild på den politiske dagsorden. Selina Juul, stifter af forbrugerbevægelsen, Stop Spild Af Mad
-
- **Brugerdreven innovation**
- Cafediskussion struktureret i
- Årsager & kilder
- Monitorering & data
- Strategier & løsninger
- Intelligent ICT & forecasting

FoodServInSPIRe
Better food at hospital

Temadag

Offentlige. fødevareindkøb og
lokalitet sommer 2012
(med AgroTech)

Tilpasse offentlige indkøbskrav
med lokal forretningsmuligheder

bemi@plan. aau.dk

Thanks to

Janice Marie Sorenson

Tina Beerman

Kwabena Ofei

Sanne Sansolios

Dwi Budiningsari

Henrik H Rasmussen

Mette Holst

Pernille Nørbak

Dorte Ruge

Our partners

DSF

RTI

AAU

Read more on

www.menu.aau.dk/