Health Informatics
Research and Development in Europe

Sofie Nørager

European Commission
Information Society Technologies Program
Systems and Services for the Citizen: Applications relating to health

HEALTH TELEMATICS R&D ACTIVITIES

from — *to*

PAST 10 years (1991-2002) "INFORMATION Technology for HealthCare"

FUTURE 10 years (2003-2014) "KNOWLEDGE Technology for Health"

1989-1990 | 1991-1994 | 1995-1998 | 1999-2002 | 2003-2006 | 2007-2010 | 2011-2014

FP2	FP3	FP4	FP5
Computers for Doctors	Networks for HealthCare Professionals	User Needs Approach	Societal Demands
Budget 20M €	Budget 100M €	Budget 140M €	Budget 200M €
Projects 30	Projects 63	Projects 158	Projects 125
Results Feasibility Study	Results AIM Community	Results 1st batch of Products	Results EU Health Telematics Industry

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IMPLEMENTATION

- Regional - National Plans
- DG INFSO supports: eHealth 2002 + 2005, eHealth Ministerial Conference 2005, TEN/TELECOM, etc
- DG SANCO supports: Public Health Policy
- DG REGIO, RELEX, EMP, ENT... supports
- Others

RESEARCH

- 1. E-Molecule: Bioinformatics
- 2. E-cellule/tissue: neuroinformatics
- 3. E-Individual: Medical Informatics

DG RTD

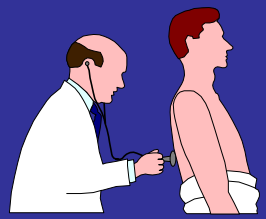
Towards wider implementation of EHCR systems

1. Organizational, cultural
2. National / regional strategies
3. Industrial issues
4. Legal - confidentiality and security of data
5. Technology and standards
6. User acceptance

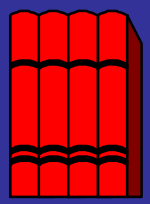
Vision: Person-Centered Health systems

MEDICAL DOCUMENTATION

HOSPITAL

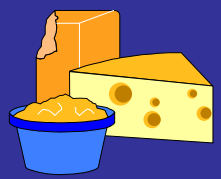


DOCTOR



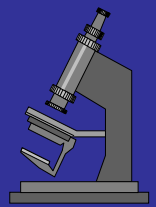
ARCHIVES

PHARMACY



DIETETICS

PATIENT ADMISSION



LABORATORIES

Examples of Ambient Intelligence

For citizens:

- Intelligent diagnosis and communications with telemedecine center
- Monitor citizens at risk: ex. diabetes, asthma, etc.

For Patients:

- Portable communication system for patients at home.
  - Integrated intelligent diagnosis (auto learning /auto adaptation)
  - Wireless communication with GP and hospital

For Health Professionals:

- Interactive computer assisted environment for decision support, prevention, diagnosis, therapy, research

6th Framework Programme 2002-2006

- **Integrating Research**
  (thematic priorities and international cooperation)
- **Structuring the ERA**
- **Strengthening the foundations of the ERA**
- **Research and training in the nuclear field**

6th Framework Programme 2002-2006

➨ **INTEGRATING EUROPEAN RESEARCH**

Priority thematic areas	**million euros**
•Genomics and biotechnology for health	2 200
•Information society technologies	3 600
•Nanotechnologies, nanosciences, etc.	1 300
•Aeronautics and space	1 075
•Food quality and safety	685
•Sustainable development, global change and ecosystems	2 120
•Citizens and governance	225
Specific activities covering a wider field of research	**1 320**
Direct activities of the Joint Research Centre	**760**

6th Framework Programme 2002-2006

➨ **NEW INSTRUMENTS**

• **Networks of excellence**

Networking of centres of excellence located in different countries with the aim of federating and integrating research on well defined subjects in the medium and long term.

• **Integrated projects**

Involving an critical mass of scientific and industrial partners with the focus on significant applications in terms of products, processes or services.

• **EU participation in jointly implemented national programmes**

(Treaty, Article 169)

6th Framework Programme 2002-2006

THE INTERNATIONAL DIMENSION

- Participation of “third countries” in priority areas
- Specific actions (support of external relations and development aid)

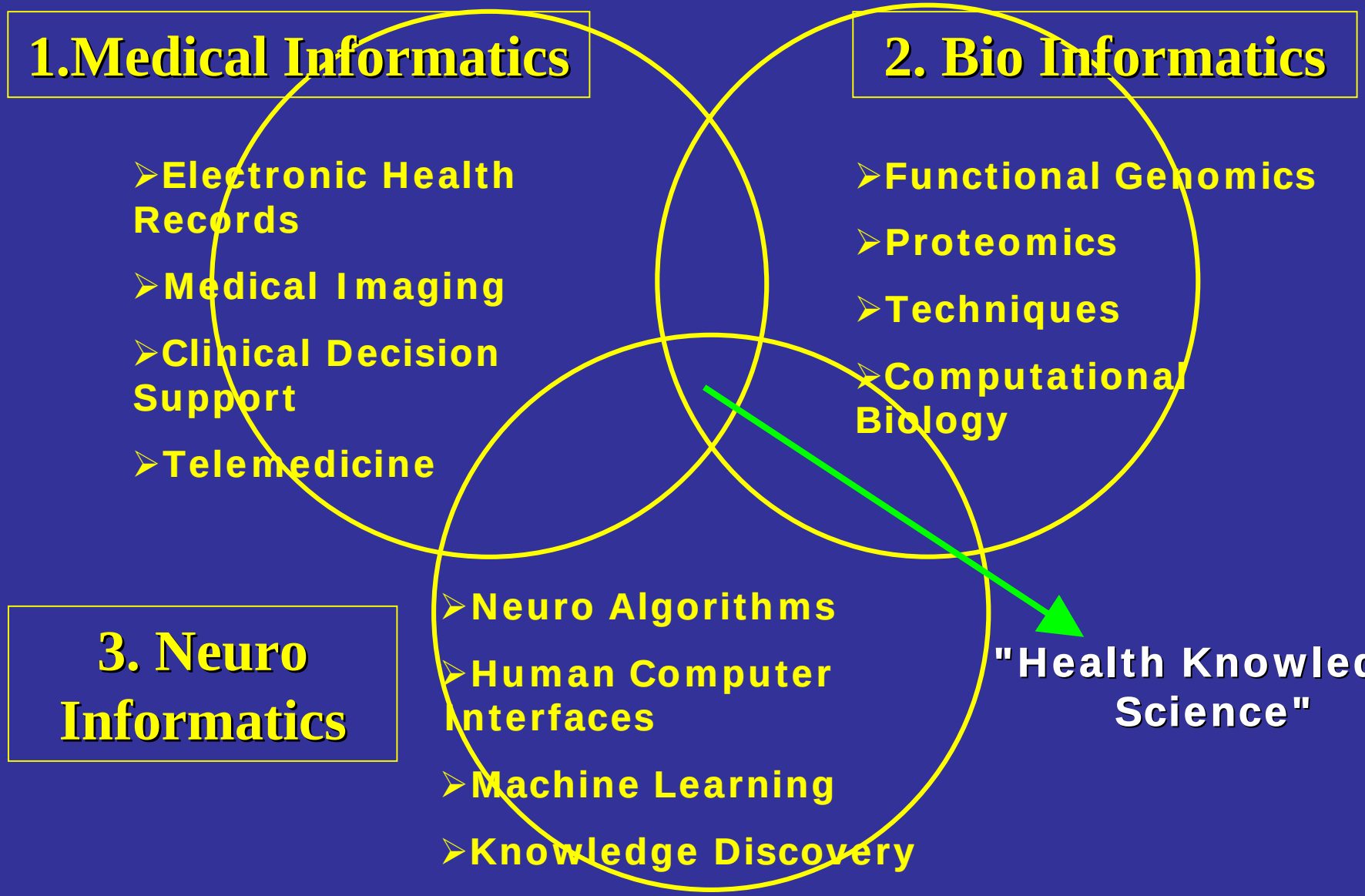
THE REGIONAL DIMENSION

- General activities
  - Support of technological dynamics at regional level
  - Less developed regions: possible support from Structural Funds
- Via “research and innovation”
  - Encouragement of trans-regional cooperation
- Via networks of excellence
  - Integration of research capacities of European regions
- Via “human resources and mobility”
  - Financial participation in regional programmes supporting mobility

6th FP - Ambient Intelligence Technologies for Individualized Health care

- **Technical and Semantic interoperability - easy navigation in the health infostructure through multidisciplinary databases of data on molecular, cell, human and population levels.**
- **Intelligent tools - knowledge representation and management, modeling, simulation, visualization**
- **Intelligent and communicating biosensors - including microsystems, nanotechnologies, Biochips**

Example 1 - Biomedical informatics



Molecular Medicine & Individualised Healthcare

Pharmacogenetics, DNA arrays, proteomics, SNPs, genetic diag.

- **MOLECULAR MEDECINE**

  Effort in explaining life and disease in terms of the presence and regulation of molecular entities

- **INDIVIDUALISED HEALTHCARE**

  Application of genomics to identify individual predispositions to disease and to design therapies adapted to the genetic profiles of patients and that could be prescribed with guarantee of security and efficiency

Dr. Fernando Martin-Sanchez

Example 2 - Wearable systems for Healthcare

- **Continuity of care**
- **Health conscious citizen**
- **Needs of patient for better care**
- **managed care, limited healthcare budgets**
- **healthcare quality control and improvement**
- **societal changes e.g. lifestyle, ageing, chronic diseases**
- ***Current shift paradigms***
  - From portable to wearable
  - From monitoring and treating to preventing
  - From low-cost to ultra-low-cost

Main future activities

- Requirements
  - Sensor
  - electronic
  - Power source
- Design
  - Sensor (bioelectrodes, piezoelectric, piezoresistive, thermoelecrtic)
  - Electronic
  - Power source
- Materials
  - realization of sensing fabrics with electroactive polymers
  - electronic
  - electrode and track
  - power source
- Device fabrication, evaluation, integration, operation, evaluation.

Example 3 - Health-Grid

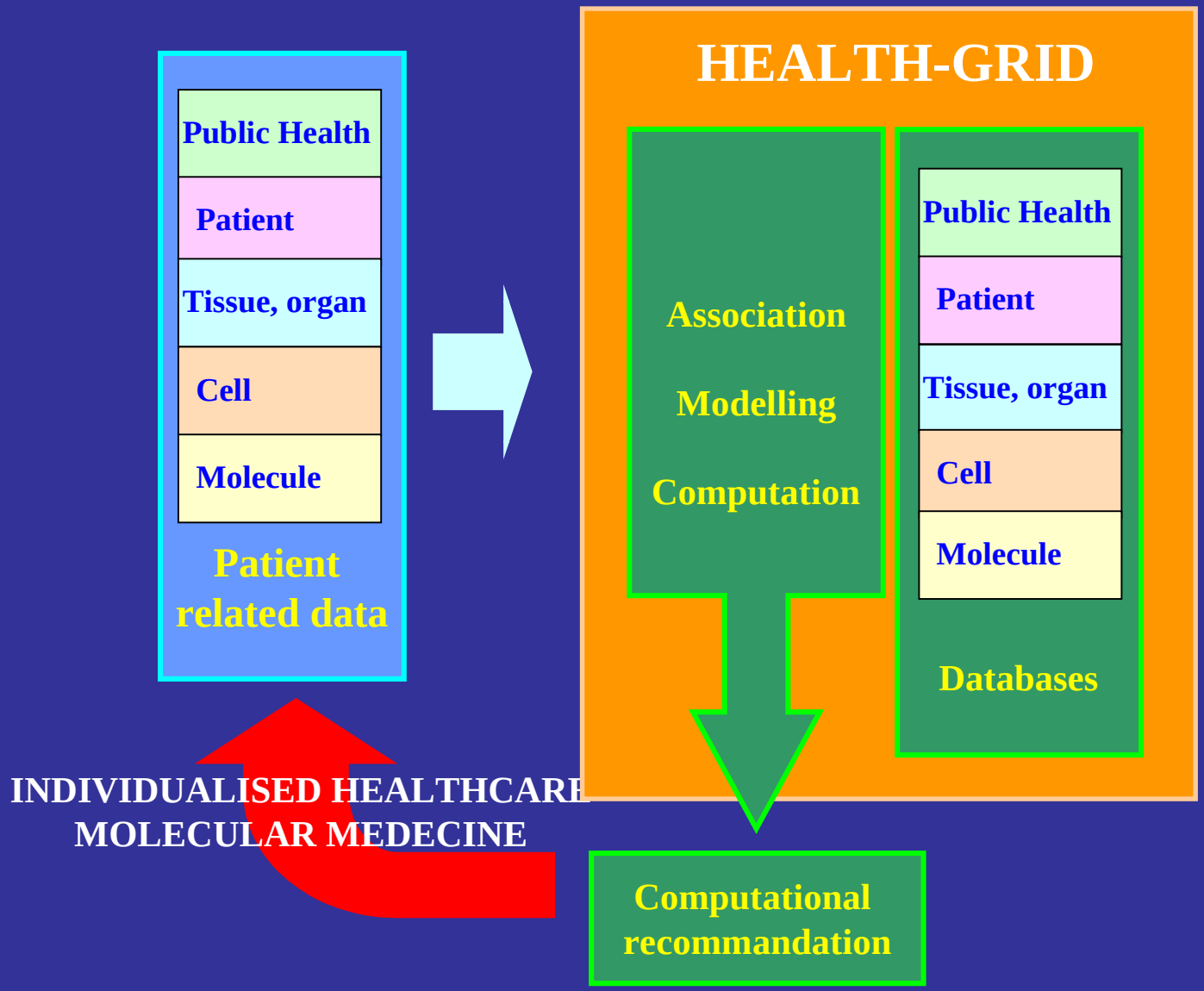
- **Application of the existing GRID technology from other areas to Health for both computing intensive applications and knowledge discovery.**

- **Development of new middleware and new applications required to meet specific request from the Health domain. (Ex. Security, heterogeneity of data …) .**

- **Development of and/or agreement on standards**

Possible Health-Grid Applications

- **E-molecule**
  - **Molecular biology databases - knowledge discovery**
  - **Molecular Medicine (e-Pharmacology)**
- **E-cell**
  - **Pathway simulations, virtual cell - computing power**
- **E-individual**
  - **Medical imaging**
  - **Combination of genetic and clinical data**
- **E-population**
  - **Environmental Influences**


Public Health
Patient
Tissue, organ
Cell
Molecule
Patient related data
HEALTH-GRID
Association
Modelling
Computation
Public Health
Patient
Tissue, organ
Cell
Molecule
Databases
INDIVIDUALISED HEALTHCARE
MOLECULAR MEDECINE
Computational recommandation

Information

- General information

  http://europa.eu.int
- General information on research

  http://europa.eu.int/comm/research
- Information about research programmes

  http://www.cordis.lu
- Information requests

  research@cec.eu.int
- Specific Sites:

  www.cordis.lu/ka1/health/home.html

  www.ehtel.org, www.ehto.org