

**European FET-Flagship initiative:**

**A cross-sectional ICT**

**"Ubiquitous Complex Event Processing,,**

**interdisciplinary together with  
computational socio-geonomics, neuroscience,  
epigenetics, brain research, epidemic,  
weather/global catastrophe emergency management  
etc.**

**WORKSHOP FET-FLAGSHIP INITIATIVE, Brussels, 9-10 June 2010**

# The forecast of Ubiquitous CEP for the next decades

## The forecast of Prof. David Luckham...



- ... until 2020 and beyond

- ... we are only at the end of the period of Simple CEP

European Challenges and Flagships 2020 and Beyond – Topics from the ISTAG, to be launched by 2013:

- Understanding life through future ICT
- Anticipation by simulation – Managing complex systems with future ICT
- Future Information Processing Technologies
- The Team Player: Future Problem Solving Technologies
- Robot Companions for Citizen

[ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/press-17\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/press-17_en.pdf)

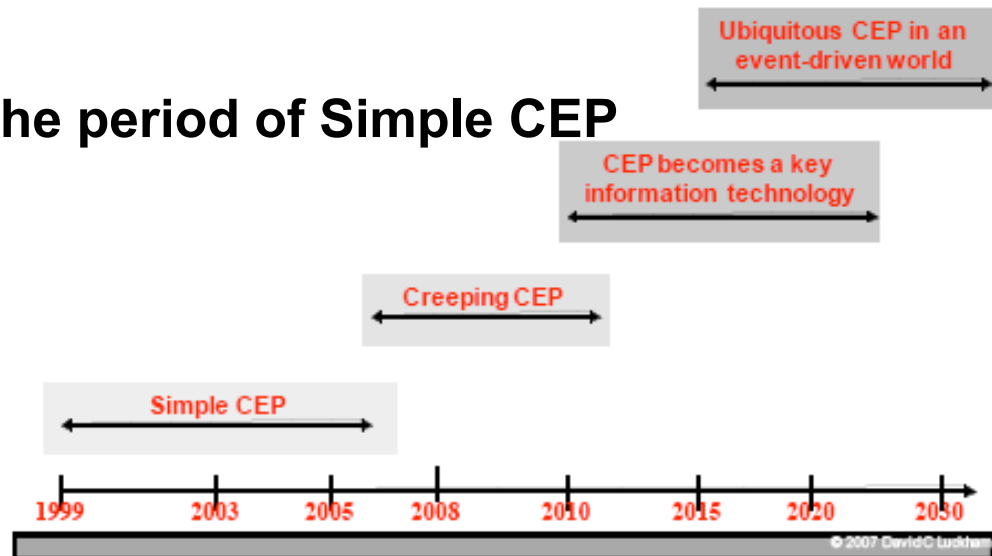
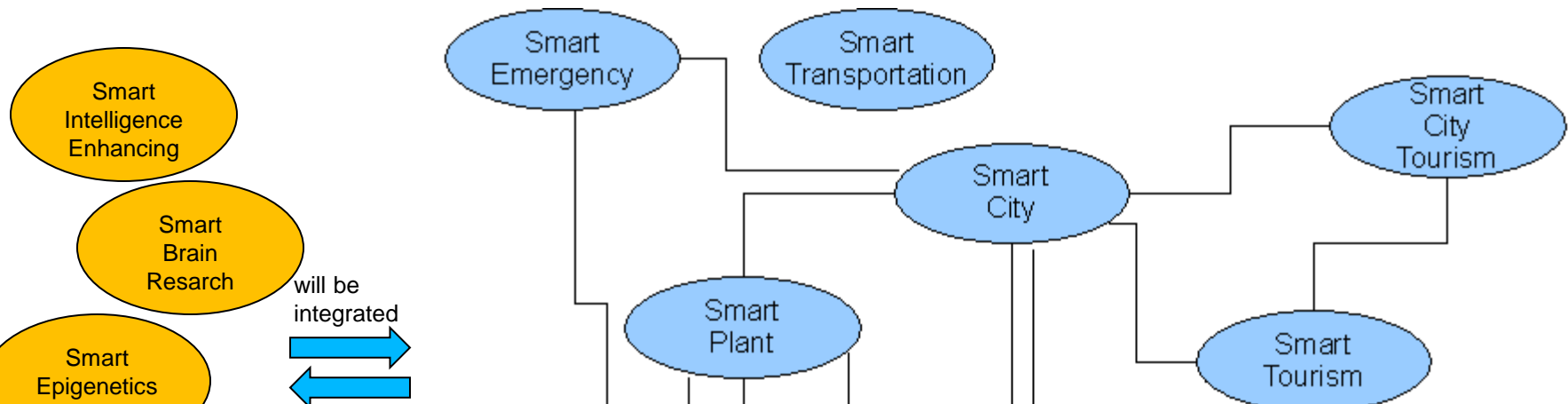
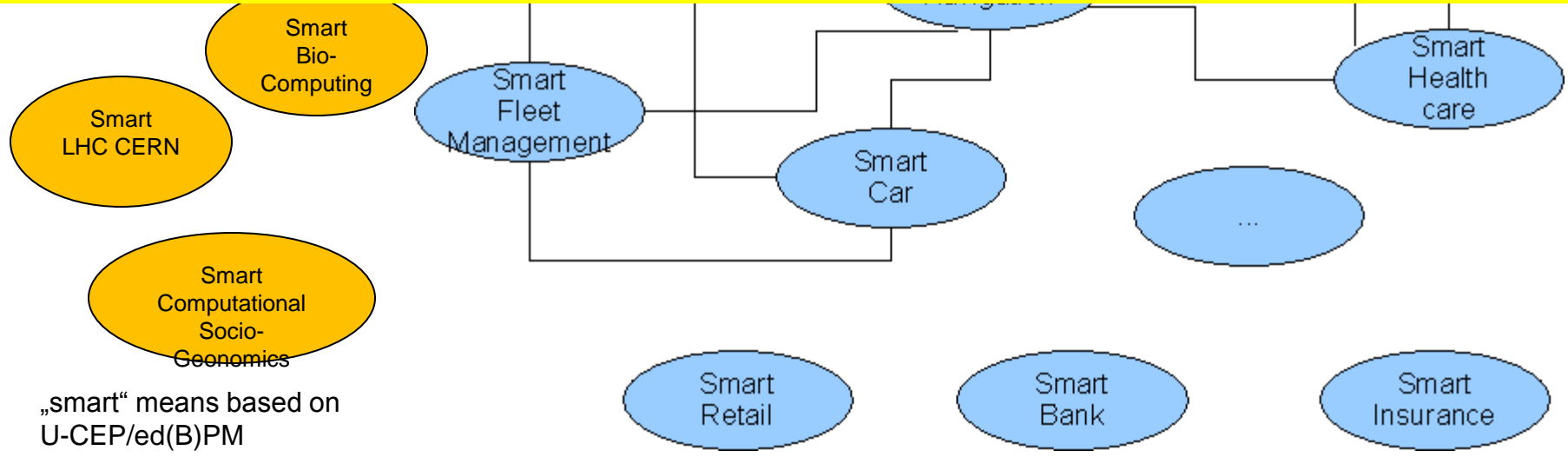


Figure 1: The four stages in the evolution of CEP applications.

# Ubiquitous CEP - Current domains and their interdependencies: What we are already going to start and what we will do until 2020 and Beyond

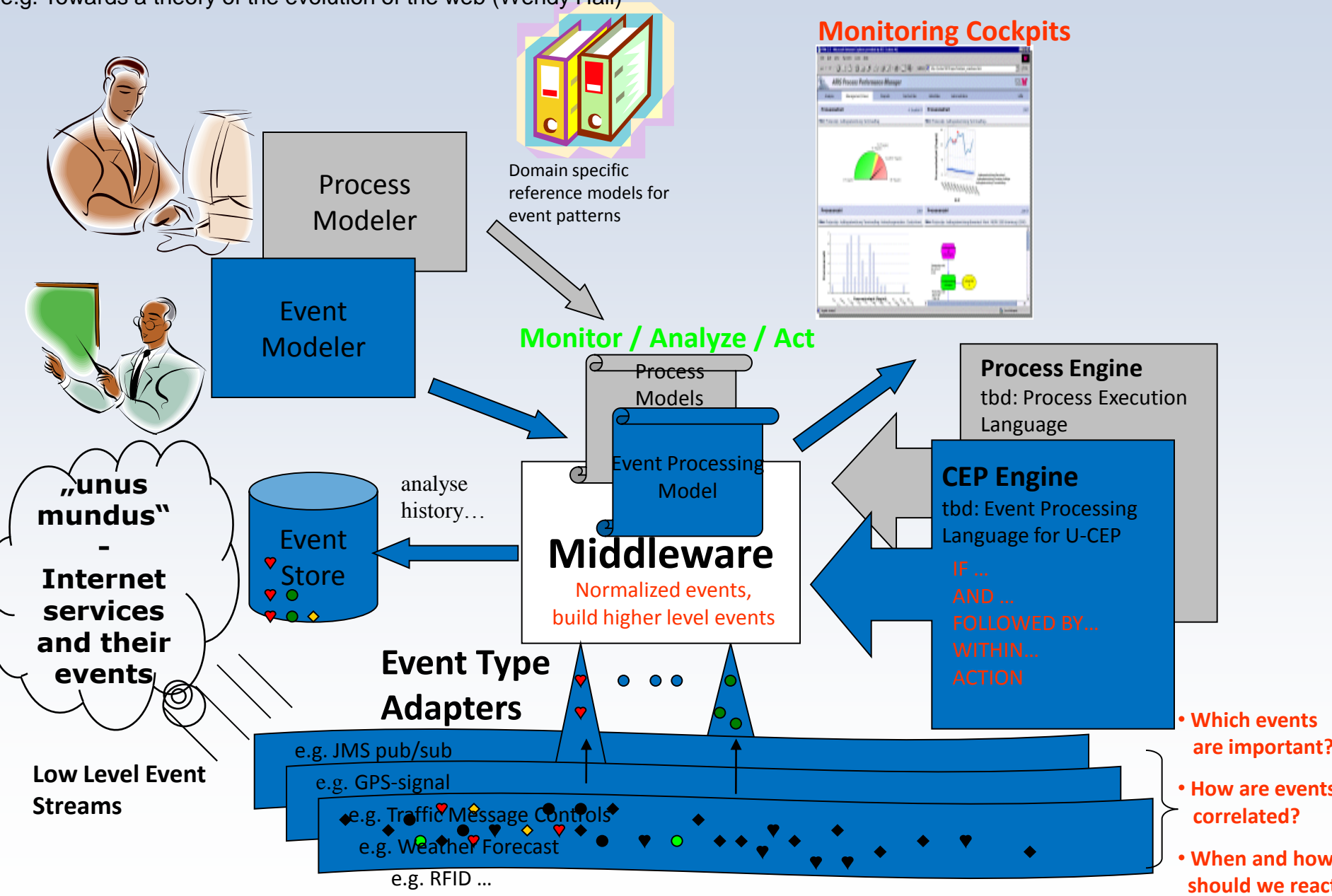


Interdisciplinary FET-flagship proposal based on Computational Socionomics, Epigenetics, Brain Research, Bio- and Quantum Computing, ... and Ubiquitous Complex Event Processing / Event-Driven Process Management



# The Principle of U-CEP – Reference Model

Integration with other proposals:  
 e.g. Towards a theory of the evolution of the web (Wendy Hall)



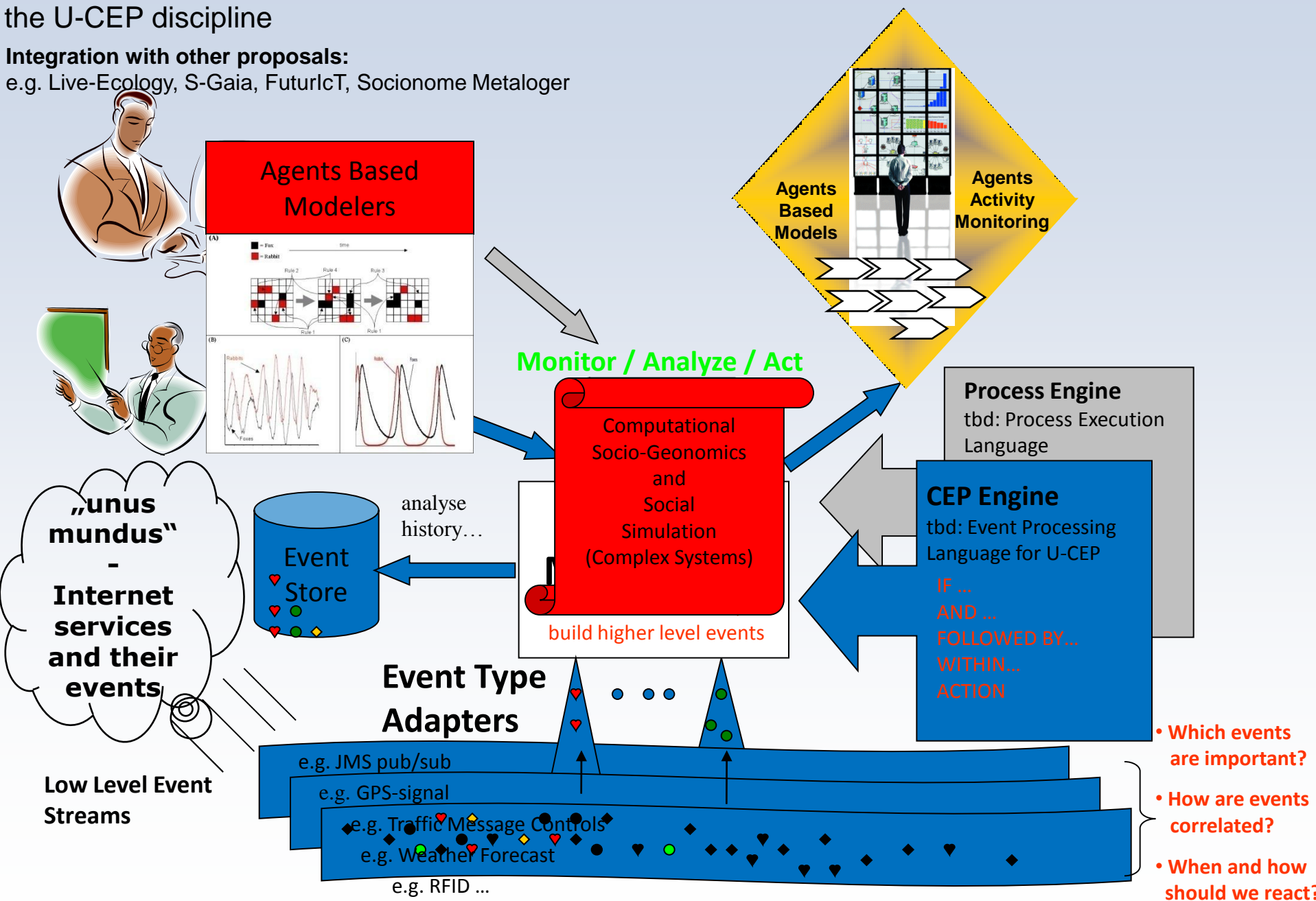
- Which events are important?
- How are events correlated?
- When and how should we react?

# Computational Socio-Geonomics / Social Simulation / e.g. 10 Billion Agents

“Emergences” of the Computational Socio-Geonomics discipline correspond to “Complex Events” of the U-CEP discipline

Integration with other proposals:

e.g. Live-Ecology, S-Gaia, FuturICt, Socionome Metaloger

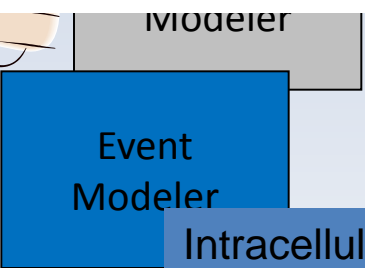
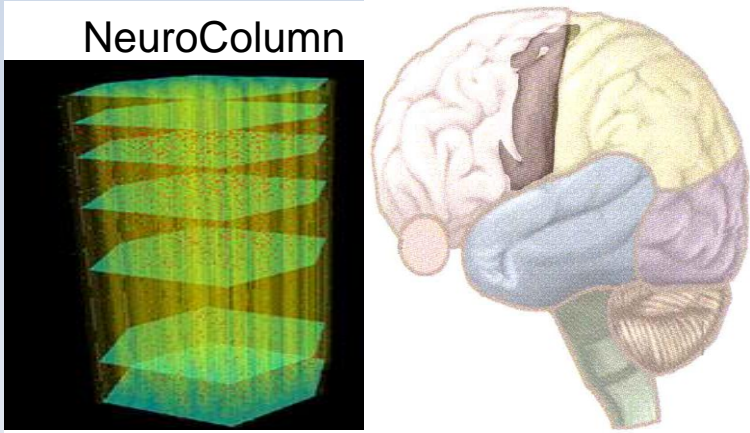


# Enhancing human intelligence and cognitive or physical abilities

connect humans to more events of the universe (resp. Internet services)

## Integration with other proposals:

- e.g. - Ray Kurzweil: Singularity is Near / Henry Markram Blue **Brain** /
- Bruce H. Lipton: Epigenetics – Intelligent **cells** /
- Karlheinz Meier: Design, construction and Operation of a Neuromorphic Computation facility
- Plamen Simeonov Integral **Biomathics**,
- Francois Képès, Marc Schoenauer : Using Evolution to compute
- Kevin Warwick: Brain Computer Interface - **Cyborg**

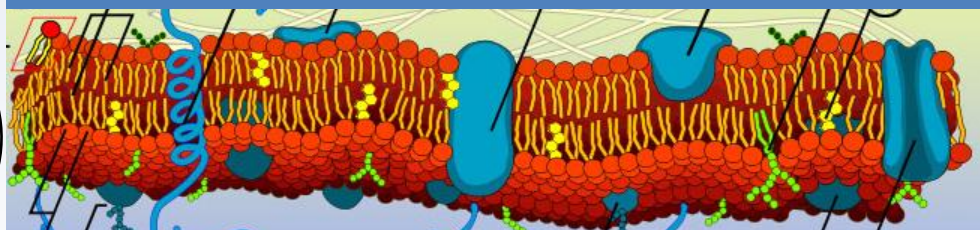


Monitor / Analyze / Act

Intracellular effectors = Event Processing Agents

Intracellular effectors = Event Processing Agents

Intracellular effectors = Event Processing Agents



Protein machinery

Protein machinery

...

Extracellular receptors = event adapters

Adapters

e.g. JMS pub/sub

e.g. GPS-signal

e.g. Traffic Message Controls

e.g. Weather Forecast

e.g. RFID ...

„unus mundus“  
-  
Internet services and their events

Low Level Event Streams

Which events are important?

• How are events correlated?

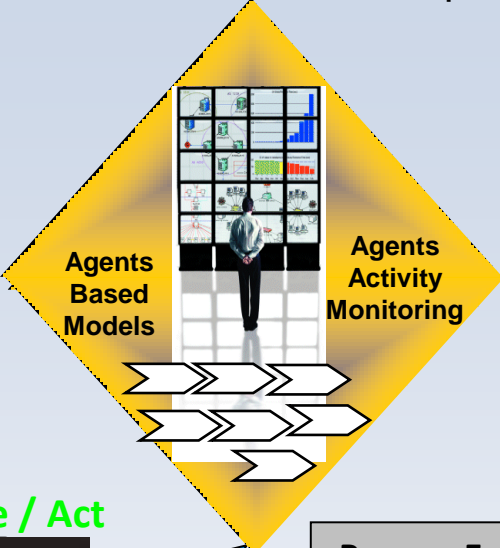
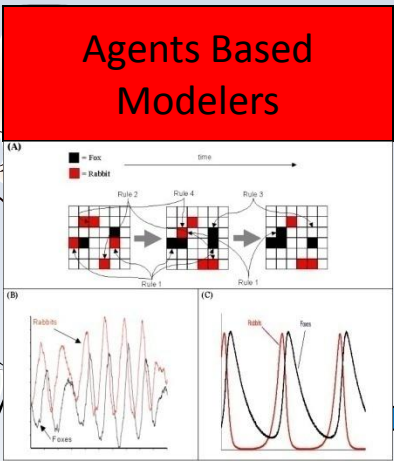
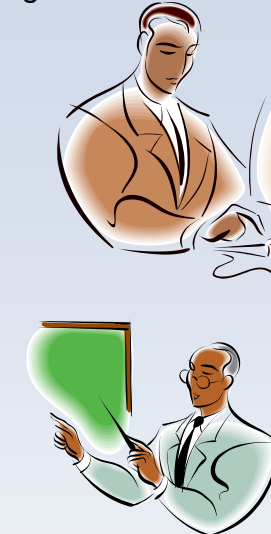
• When and how should we react?



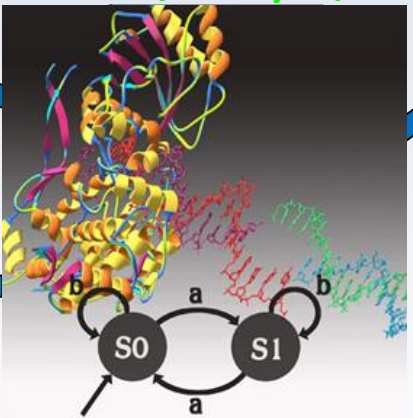
# DNA-based Biocomputers / Quantum Computing

the obviously appropriate computer technology for U-CEP because of massive parallel processing

Integration with other proposals:  
e.g. Peter Zoller ICT beyond limits



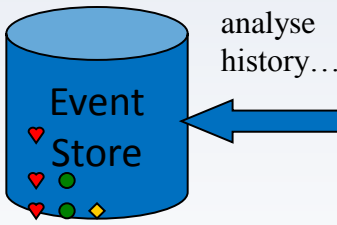
Monitor / Analyze / Act



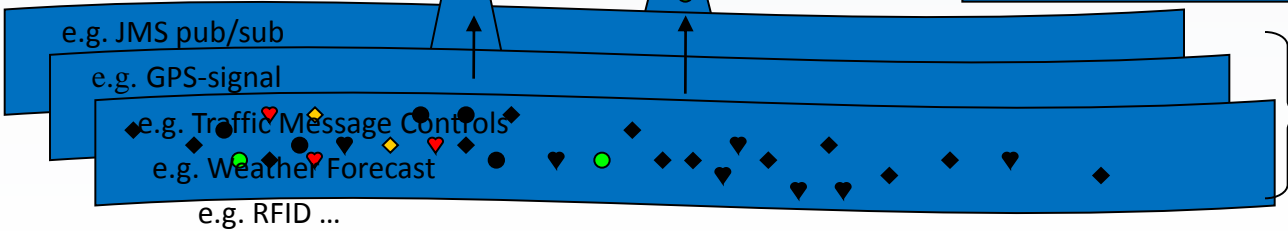
**Process Engine**  
tbd: Process Execution Language

**CEP Engine**  
tbd: Event Processing Language for U-CEP  
IF ...  
AND ...  
FOLLOWED BY ...  
WITHIN ...  
ACTION

„unus mundus“  
-  
Internet services and their events



Event Type Adapters



- Which events are important?
- How are events correlated?
- When and how should we react?

# Robot Companions for Citizen – driven by Event Processing

Integration with other proposals:  
e.g. Paolo Dario Robot companions for citizens

