SCHEDULE FOR ECCELL KICK-OFF MEETING
ELECTRONICALLY PROGRAMMABLE CHEMICAL CELLS
ECLT VENICE, OCTOBER 20-21, 2008

Monday, October 20, 2008

9:00-9:30 Overview of project, McCaskill
9:30-11:00 Presentations of current status of research activities relevant to ECCell
Titles are rough ones by coordinator
- Microfluidics and Gels, Wagler/Verhaelen 20 mins
- Digital Microelectrode Arrays, Tangen 10 mins
- Thio-DNA replication, Patzke/Kiedrowski 15 mins
- DNA-Block-copolymers, Kwak/Singh/Hermann 15 mins
- Redox chemistry and DNA control, Willner 15 mins
- Redox metabolism for LA Bug and simulation, Rasmussen 15 mins

11:00-11:20 Coffee Break

11:20-12:30 Discussion and coordination of workplan
12:30-13:30 Lunch

13:30-15:00 Discussion of specific proposals for coordinated research
Initial suggestions are:
13:30 Replication: electronic redox and pH control
14:00 Gelation: electronic redox, pH and DNA control
14:30 ECCell Life Cycle : MEMS and chemistr

15:00-15:30 Coffee Break

15:30-16:30 Open Discussion of Synergies and Paths Forward

16:30-17:45 General Council Meeting

Tuesday, October 21, 2008

8:30-10:00 Discussion of key coordinated experiments in year 1: topics to be fixed in afternoon session on Monday. Including 2 to 3 -5-minute presentations on relevant technology from participants.
8:30 X1
9:00 X2
9:30 X3

9:30-10:00 Coffee Break

10:30-11:30 Information Processing with ECCell
10:30 DNA-based information processing
10:50 Programmable-separation based IT
11:10 Feedback-loop based processing & evolution

11:30-12:45 Concrete experimental and simulation planning &
Planning of upcoming meetings and ECLT activities

12:45 Closing Discussion
13:00-14:00 Lunch

ABSTRACT:

Electronic Chemical Cell - ECCell

As a result of the groundwork laid by the PACE project, the construction of one kind of artificial programmable cell is now an achievable objective in the coming three years. A project ECCell in FET-open has been approved starting September 2008.

The aim of the project is to establish a novel basis for future adaptive embedded information technology at the molecular level by constructing the first electronically programmable chemical cells (ECCell). These ECCells will function through an interplay of chemical microprocessors and information molecule chemistry. Chemical microprocessors act as coprocessors coupled to chemical information systems through a digital electronically programmable microelectrode MEMS interface, taking advantage of integrated electronics and microfluidics. Information processing in molecular systems is not in direct competition with silicon technology, but the long-term goal is to integrate information processing with self-contained molecular construction of information processing materials and components. ECCells will pro-vide a paradigmatic proof of principle that such technology is possible and already useful in nano- and microscale embedded system applications. The novel chemical microprocessor technology required to do this will also provide a programmable real-time interface to control other complex chemical information systems. This is naturally a high-risk, embryonic research project, but based on solid interdisciplinary research and aimed at a breakthrough which will lay the foundation of a new embedded IT for immersed micro- and nanoscale molecular information processing, with a paradigm shift to digitally programmable chemical systems.

LIST OF PARTICIPANTS

Ruhr Universität Bochum (RUB)

RUB-BioMIP
John McCaskill
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Guest at ECLT
Norman Packard