EUROCORES Programme
European Collaborative Research

Networking Activity
Scientific Report Form

a) Summary

The meeting in Elmau was supposed to be the last general gathering of all the EurosSynbio teams before the end of the first funding period. As most of the team members had started their projects in time by the end of summer 2010, and since not all of the national agencies allow a transfer of unspent resources to prolong the projects cost-neutrally, it was clear that the meeting would have to be scheduled in the first half of 2013, in spite of the quite recent conference in Groningen in fall 2012. In order to motivate the team members to participate in yet another meeting rather shortly after the last, it was decided to have a completely different format, e.g. a more retreat-like atmosphere at a rather remote place with ample time for the PIs to interact very intensely. It was decided to have this meeting in Germany, and Schloss Elmau with its very remote setting in the Bavarian Alps (which some of the PIs knew from previous scientific events organized there), appeared to be the perfect place. In spite of its tranquil setting away from any larger town, it is to be reached rather comfortable within 90 minutes from the Munich airport. The suggestion of having a meeting at Elmau was received overwhelmingly positively by all PIs, and indeed, we succeeded in recruiting a very substantial number of core researchers with their very enthusiastic collaborators on PhD and postdoc level. Petra Schwille, her institute situated close enough to the place in Munich, Bavaria, and her secretary took over the full organization, helped by the ESF staff with regard to financing and reimbursement. The program repeated the successful outline of the Groningen meeting, reserving a specific time slot of 90 minutes for all the project teams and leaving them freedom to shape the program themselves, with one invited keynote speaker each. There was poster session and a general discussion about future research and funding strategies, as well as a “team building” slot devoted to common activities in small teams outside of the seminary room. As a short conclusion, both the program and the format of the meeting were a true success, and all participants were overwhelmingly satisfied by the three days in Elmau, which allowed us to familiarize to a large extent with the science but also the people of the other teams. We truly hope that there will be many possibilities to continue the collaboration on this extremely interesting and inspriring field of research.

b) Final programme of the event

Scientific Programme

MONDAY, 6 MAY

14:50 – 15:00	Opening remarks by Petra Schwille
15:00 – 16:30	Session 1: SYNAPTA **Invited speaker Philippe Marlière** "Morphing the chemical constitution of living organisms: the Weltanschauung and Schlachtplan of Xenobiology" **Phil Holliger, PL:** "Reconstructing the RNA World" **Alex Taylor**: "Using synthetic genetics to select nuclease-resistant nucleic acid ligands"
16:30 – 17:00	Coffee break
17:00 – 18:30	Session 2: SynDiv **Invited speaker Hendrik Dietz**: " Encoding shape & function in DNA sequences" **Petra Schwille, PL:** "Positioning of the Z ring by E. coli Min proteins" **Cees Dekker**: "Cell division and Min oscillations in arbitrarily shaped E. coli bacteria" **David Sherratt:** "Cell division in live bacteria"
19:00 – 20:00	Dinner
20:00 – 22:00	Discussion and Poster session

TUESDAY, 7 MAY

09:00 – 10:30	Session 3: SYNMOD **Oscar P. Kuipers, PL:** Introduction to the SynMod project: "Synthetic biology to produce highly modified peptides" **Invited speaker Jörn Piel:** "Insights into the biosynthesis of polytheonamides, peptide toxins from a marine sponge" **Sven Panke**: "High-throughput nL-reactor screening for antimicrobial peptides" **Harald Guldan:** "Design and synthesis of modular lantibiotic precursor libraries" **Markus Schmidt/Camillo Meinhart:** Update on Documentary EuroSynBio
10:30 – 11:00	Coffee break
11:00 – 12:30	Session 4: NANOCELL **Daniel Müller, PL:** Introduction to the Nanocell-project: "From nanocells to molecular factories: Engineering molecular systems" **Invited speaker Viola Vogel:** "How Bacteria and Cells Exploit Mechanical Forces"

	Richard Berry: “ Modular design of a swimming NANOCELL” **Dimitrios Fotiadis:** "Engineering of Biomolecular Modules for NANOCELLs" **Xiaoyan Zhang:** “Biomimetic Solid-supported Polymer Bilayer Incorporated with Membrane Proteins”
13:00 – 14:00	Lunch
14:30 – 19:00	Common activity program to familiarize with other teams and intensify discussions *This slot was exchanged with the Wednesday morning program because of the bad weather. 4 groups were formed for intense interactions and discussions. Three of these groups went on a hike in the Elmau area, one group stayed at the meeting site*
19:00 – 20:00	Dinner
20:00 – 22:00	Discussion about funding strategy, planning, common publications

WEDNESDAY, 8 MAY

09:00 – 10:30	Session 5: SYNMet **Invited speaker Víctor de Lorenzo:** ”Naturally-occurring and engineered regulatory logic of environmental bacteria” **Trygve Brautaset, PL:** Introduction to the SynMet project **Jonas Müller:** “Engineering methylotrophy into E. coli” **Stephanié Heux:** “In silico design and in vivo validation of synthetic methylotropic pathways” **Jessica Stolzenberger:** “Investigation of the MeOH utilization in Bacillus methanolicus MGA3 via characterization of the RuMP-pathway enzymes”
10:30 – 11:00	Coffee break
11:00 – 12:30	Conclusions and Outlook, Brainstorming for future activities and joint publications
13:00 – 14:00	Lunch
	Departure

c) Description of the scientific content of the event

The meeting in Elmau was probably one of the most intense (and enjoyable) of all program meetings. Due to the very special form of the event, only the “hard core” of the scientists, i.e. PIs plus one or two of their co-workers at maximum participated. As it was the last one during the funding period, the talks were largely devoted to put the obtained results in perspective of what had been originally proposed. It was evident for most of the teams that, in spite of very good success on smaller scale and several publications already so far, the time frame of only one funding period was too short to reach the very ambitious long-term goals.

The program started with the presentation of the SYNAPTA project, with Project Leader Phil Holliger giving a broad introduction and perspective, and, in addition to presenting the progress of the project, also eluding to very interesting recent work going on in his lab on RNA replication at low temperatures, which provides interesting new perspectives on the origin of life, and thereby neatly connects to the work of the two bottom-up teams of SynDiv and NANOCELL. It was very clear that there would be interesting perspectives for future collaborations across the teams.

The second session was organized by the SynDiv team, who reported about their progress on the understanding of bacterial cell division and its reconstitution *in vitro*. The invited speaker of the SynDiv session, Hendrik Dietz, gave a very enlightening talk on the power of DNA origami to establish protein-like function by bottom-up assembly of biomolecules on the nanoscale. These two sessions were taking place on the first day of the symposium (Monday), whereas in the evening, all the teams gathered to discuss possible collaborations across the projects, and for a small poster session.

The third scientific session, on Tuesday, was organized by the SYNMOD team, with Oscar Kuipers as the team leader, who gave a very illuminating general talk about the challenge of antimicrobial drugs in general and the power of lantibiotics. The invited speaker, Jörn Piel, was received very enthusiastically and in the discussion soon found inspiring starting points for possible future collaborations with several members of the different teams.

The fourth session on Tuesday was organized by the NANOCELL team, with an exciting talk delivered by Viola Vogel on the mechanics of forces exerted by bacteria on the nanoscale, which could be of potential importance in bottom-up designs of cells, as represented by the long-term goal of this team. There was a very long and fruitful discussion after her talk, also with members of the other teams such as SynDiv. New starting points for future collaborations could be identified. The further program of the NANOCELL session was very intense, as many different speakers represented the many groups participating, and the potential but also the challenge of bringing so many different research fields together was obvious.

Tuesday afternoon should have been devoted to teambuilding and intense discussions in small groups across the teams during a hike or other communicative activities, but because of the bad weather, this program was exchanged with the Wednesday morning program. Thus, Tuesday afternoon started with the program of the SYNMet team, another many-member team. Their program was introduced by team leader Trygve Brautaset, who in his talk provided a short overview over the entire scope of the consortium. The invited speaker, Victor de Lorenzo, delivered a very general and very inspiring talk at the very core of Synthetic Biology, and put the task of the SYNMet project into a very broad perspective of bacteria-based synthetic biology.

The last session of the day was devoted to a very intense discussion about future possibilities to collaborate across teams, and how to acquire future funding through the EU or other funding agencies, to continue the very successful but (at the end of the funding period) still far from completed research that was triggered in the different teams by the EuroSYNBIO initiative.
Another very important point of discussion was the possible dissemination of the activities. The film team, in particular Camillo Meinhard, presented their work so far about a film to be produced of the different projects funded by EuroSYNBIO. The participants were impressed about the high technical and artistic quality of the material acquired and cut so far, which displays a very impressive picture of Synthetic Biology across Europe.

In addition to this innovative and unusual way of public dissemination of research in the project teams, a common publication strategy was devised, in terms of initiating a special issue of a well-respected scientific journal with clear connections to Synthetic Biology as a topic. It was decided that ChemPhysChem, a European based journal of the Wiley VCH group, who has previously voiced some interest in a special issue on Synthetic Biology to Petra Schwille (member of the Editorial Board of this journal) should be further explored. A collection of preliminary ideas for papers will be assembled, the manuscripts should be submitted by end of 2013.

On Wednesday, the different activities in small teams that were originally planned for Tuesday afternoon took place. Several people went for a hike (two teams, each went a different route), others stayed at the meeting place. It was intentional that the groups were mixed across the project teams, which worked surprisingly well without concrete planning. The morning was thus very intense with many long bilateral discussions about past, actual and future work. All participants were very inspired afterwards and found that an event like this should have happened earlier during the funding phase. Nevertheless, as a summary of the symposium, all the participants were highly motivated to engage in similar funding activities with partners of the own or the other teams in the near future.

d) Assessment of the results and impact of the event on the EUROCORES programme.

As outlined under c), there was a clear consensus that similar funding initiatives with the same or other team members should be explored in the near future. Synthetic Biology as a topic is still at the beginning of unfolding its potential in basic research and applications, and it was evident that in the existing teams, a large fraction of key groups in this field in Europe are already represented. It will be crucial not to lose grip at that point in time, in spite of the economical crisis that has hit Europe but also the US, still being the pacemaker in the field. High expectations have recently been raised by the ERANET initiative in Synthetic Biology, and many teams have already quite explicit plans how to contribute to this initiative.

All in all, in spite of the (in the scientists opinion) too early termination of the first funding wave through Europe in the field of Synthetic Biology, all the participants consider the EUROCORES SynBio a very important success story of how a desirable development of a field could be triggered in Europe. The meeting in Elmau was very important in fostering a common spirit, which is essential to compete with the already well-connected teams in the US, but also with new initiatives sprouting in Asia.

e) List of speakers and participants

Subgroup	Name	Institute
SynAPTA	Prof. Philipp Holliger **PL**	MRC Laboratory of Molecular Biology, Cambridge, UK
	Dr. Philippe Marlière **Speaker**	ISTHMUS Sarl. Paris, France
	Dr. Alex Taylor	MRC Laboratory of Molecular Biology Dept. Proteins and Nucleic Acids, Cambridge, UK
SynDiv	Prof. Petra Schwille **PL**	Max Planck Institute of Biochemistry Dept. Cellular and Molecular Biophysics, Martinsried, Germany
	Prof. Hendrik Dietz **Speaker**	TU Munich, Physics Dept., PI Laboratory for Biomolecular Nanotechnology
	Dr. Yaron Caspi	Delft University of Technology

		Faculty of Applied Sciences Kavli Institute of NanoScience
	Prof. Cees Dekker	Delft University of Technology Faculty of Applied Sciences Kavli Institute of NanoScience
	Prof. David Sherratt	University of Oxford, Dept. Biochemistry
	Dr. Jakob Schweizer	MPIB (Oxford University), Dept. Biochemistry
SynMet	Dr. Trygve Brautaset **PL**	Materials and Chemistry Dept. Biotechnology, Trondheim, Norway
	Prof. Víctor de Lorenzo **Speaker**	National Center of Biotechnology CSIC, Dept. Systems Biology, Madrid, Spain
	Dr. Stephanie Heux	INSA Toulouse, Dept. LISBP
	Jonas Müller	Institute of Microbiology, Department of Biology, Zürich, Switzerland
	Prof. Jean Charles Portais	INSA Toulouse, Dept. LISBP
	Prof. Dr. Wim Quax	University of Groningen Pharmaceutical Biology
	Jessica Stolzenberger	University of Bielefeld Dept. Genetics of Prokaryotes
	Prof. Volker Wendisch	University of Bielefeld, Dept. Genetics of Prokaryotes
SynMod	Prof. Dr. Oscar P. Kuipers **PL**	University of Groningen, Dept. Molecular Genetics
	Prof. Jörn Piel **Speaker**	ETH Zürich, Institute of Microbiology
	Dr. Harald Guldan	University of Regensburg, Medical Microbiology and Hygiene, AG Wagner, Molecular Microbiology and Gene Therapy Unit
	Mag. DI Wolfgang Kerbe	BIOFACTION, Linz, Austria
	Camillo Meinhhart	BIOFACTION, Media/Science Comm., Wien, Austria
	Marco Zimprich	BIOFACTION, Photographer
	Dr. Manuel Montalban-Lopez	University of Groningen Dept. Molecular Genetics
	Dr. Markus Schmidt	BIOFACTION Dept. Technology Assessment, Wien, Austria
Nanocell	Prof. Daniel J. Müller **PL**	ETH Zürich, Biosystems Science and Engineering
	Prof. Viola Vogel **Speaker**	ETH Zürich, Laboratory of Applied Mechanobiology
	Dr. Richard Berry	University of Oxford, Dept. Physics, Clarendon Lab
	Prof. Dr. Dimitrios Fotiadis	University of Bern Institute of Biochemistry and Molecular Med
	Dr. Daniel Harder	University of Bern Institute of Biochemistry and Molecular Med
	Dr. Robert Ishmukhametov	University of Oxford, Physics Dept., Clarendon Laboratory
	Prof. Dr. Sven Panke	ETH Zürich, Biosystems Science and Engineering
	Dr. Xiaoyan Zhang	University of Basel, Dept. of Chemistry