

## Conference:

# "Optimal Production of High Value Compounds – Dialogue Between Fields for more Efficient Output"

**Where and when:** Berkeley, 10-12 Nov 2014

**Participants:** An expected ~ 100 participants ranging from PhD students, postdocs, and senior scientists from academia and private industry

### Scientific Committee:

- Prof. Poul Erik Jensen (University of Copenhagen, chair)
- Prof. Jay Keasling (UC Berkeley, vice-chair)
- Prof. Birger Lindberg Møller (University of Copenhagen)
- Prof. Kris Niyogi (UC Berkeley)
- Dr. Thomas Högberg (LeoPharma)
- Dr. Jørgen Hansen (Evolva).

### Focus of the conference

The conference seeks to explore a new multileveled approach to speed up knowledge development and enter the fast track to optimal, large-scale and market-relevant production of high value compounds.

The approach focuses on 3 levels of collaboration

1: Between the parallel, rarely interacting and presently competing fields of Synthetic Biology and Organic Synthesis

2: Across production host for best practice and knowledge transfer

3: Between academia and industry to optimize dialogue, bridge barriers and boost partnering

The conference is structured around the three focus areas in dedicated sessions with presentations, facilitated dialogue and networking activities.

The outcome of the conference will be new collaborations, PhD/postdoc training via short presentations, facilitated workshops, planning of exchange research visits, transfer of knowledge and methodologies.

In addition creating critical mass around research questions addressing how to transfer and exploit knowledge obtained in one type of production host to another. And not least, dialogue with industrial partners to ensure coherence between our focus compounds and business potentials.

### The conference will consist of 5 sessions:

1. Synthetic Biology & Organic Synthesis – common challenge, competition or collaboration?

*Until now organic synthesis and synthetic biology have been parallel disciplines that compete in many aspects but rarely interact. The conference will feature key notes speaks from Jay Keasling and Phil Baran, each leaders-of-their-field within Synthetic Biology and Organic Synthesis to present and discuss potentials in bilateral collaborations on synthesis of high value compounds with an overall aim of a more holistic approach and a more efficient output.*

*We will seek out ways to combine the two fields and pave the way for new forms of collaboration. Via synthetic biology a huge range of natural compounds and their intermediates can be produced in an environment-friendly way for instance in photo-bioreactors. Organic synthesis is more polluting and demands many complex steps but can produce new-to-nature compounds. Ideally the two fields could be combined by synthetic biologist producing the core backbone molecules, which*

are then further modified by organic synthetic chemists giving rise to new compounds produced in an efficient and sustainable way.

**2. Facilitated dialogue between synbio, synchem and industry**

*The session seeks to explore optimized dialogue between academia and industry for better alignment between scientific discovery work and faster transfer of knowledge to marketable products.*

*The session will include one or two presentations from the industry and facilitated matchmaking and discussion.*

**3. Production hosts and bilateral knowledge exchange: E. coli, yeast, moss, microalgae, plant cells**

*The session seeks to explore the possibility of knowledge-transfer between production hosts to enable and enhance faster development across platforms. Specific focus areas will be: Pros and cons of the different production hosts available, and knowledge exchange between both established and new hosts. Furthermore, the session will focus on which compounds could be produced in which hosts, and which bottlenecks are there in each host. Not at least – can we learn from the experience learned in other hosts to overcome these bottlenecks? We will also hear about the advantages and challenges of using photo-bioreactors.*

**4. Compartments & Localization - Enzymes and Products**

*To produce a compound in a living organism you have to ensure that the enzymes producing the compound as well as the compound itself end up in the right compartment(s). Furthermore the enzymes need to be correctly folded, functional and maybe placed correctly in a complex. The product should be placed where it cannot harm the cell, in non-toxic concentrations, and one should be able to isolate it. This session will deal with scaffolding, trafficking of membrane systems, methods to keep track on the localization of enzymes and products, and recovery of the products.*

**5. Unifying cloning principle and synthetic biology workflow to facilitate generation of 100s of permutations**

*Which cloning methods and constructs can be used in which organisms and can some methods be transferred from one organism to the other. This session will address topics such as the challenges of producing constructs and stable transformants, optimized workflow, usage of inducible systems for lower toxicity, gene stacking, YACs and constructs for up-regulation of C5, C10 and C20 precursors.*