

# **Bioethanol in a Biorefinery Context**

**A graduate level course arranged by the European Integrated  
Project NEMO in collaboration with  
BIOREGS, Bio4Energy and Umeå University**

**Örnsköldsvik, Sweden  
23-25 May, 2012**

*Organizing committee*

Eckhard Boles, University of Frankfurt, Germany  
Paola Branduardi, University of Milano-Bicocca, Italy  
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Gunnar Lidén, Lund University, Sweden  
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Lisbeth Olsson, Chalmers University, Sweden  
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Laura Ruohonen, VTT, Finland  
Liisa Viikari, University of Helsinki, Finland  
Sune Wännström, SEKAB, Sweden  
Jennie Söderström, Processum, Sweden  
Leif Jönsson, Umeå University, Sweden

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## SCOPE OF THE COURSE AND INTENDED AUDIENCE

Biomass conversion has a central place in the formidable challenge of obtaining a sustainable production of fuels and chemicals. In this 3-day course, we will present and discuss state-of-the art of lignocellulose conversion technology put into the broad framework of biorefineries. The course is intended for graduate students working on various aspects of biomass conversion, as well as for engineers or microbiologists active in the field who want to obtain an overview of the central issues and biomass conversion technology available.

Since the course is arranged by the partners of NEMO - *Novel high-performance Enzymes and Micro-Organisms for conversion of Lignocellulosic Biomass to Ethanol* – a large Integrated research project financed within the 7th Framework program (<http://nemo.vtt.fi/>), there will be excellent opportunities to meet and discuss with leading European researchers.

## VENUE



The course will be held at Umeå University, Campus Örnsköldsvik in the heart of Örnsköldsvik.

The course takes place in Örnsköldsvik, Sweden, which is beautifully located at the "high-coast" of Sweden ( see e.g <http://www.ornskoldsvik.se/Turism/Home.html>). The city has century old traditions in pulp and paper manufacturing, and is now a very dynamic region in terms of developing and implementing industrial technology for biorefineries.

The course lectures will be held at the premises of Umeå University in Örnsköldsvik.  
Address: Lasarettsgatan 7, 891 33 Örnsköldsvik

## REGISTRATION

Registration opens February 15 and ends April 13. The course is limited to 35 participants. Information on how to register is available at the NEMO website: <http://nemo.vtt.fi/>.

For more information please contact: [info@processum.se](mailto:info@processum.se)

## ACCOMMODATION

There are prebooked rooms available for course participants at:

**First Hotell Statt**                    1300 SEK/ per person per night

Lasarettsg 2

Contact for booking via: [Ornskoldsvik@firshotels.se](mailto:Ornskoldsvik@firshotels.se) or +46 660 265590 and bookingcode is 210512PROCESSUM

**Hotell Focus**                            Single room 1020 SEK, double room 1380 SEK

Lasarettsg 9

Contact for booking via [info@hotellfocus.se](mailto:info@hotellfocus.se) or +46660 82100 and booking code is "Processum 2012"

**Park Hotell Örnköldsvik**                    Single room 995 SEK, double room 1195 SEK

Örnköldsg 7

Contact for booking via [info@park\\_hotell.se](mailto:info@park_hotell.se) or +46660 103 60 and booking code NEMO2012

**Reservations should be made directly to the hotel before April 13.** After that date, no rooms can be guaranteed. Very important to remember the booking code!

You can find the hotels in this map:<http://kartor.eniro.se/m/9qmLG>

# COURSE SCHEDULE

## May 23

9.15 – 9.45 **Registration & Coffee**

9.45 **Welcome address**

### ***Biorefineries & Bioethanol***

10.00 – 10.30 **The Biorefinery – History and Future** (Claes Engström, CEO Processum, Örnsköldsvik)

10.30 – 11.00 **Overview of a lignocellulosic ethanol plant** (Sune Wännström, Research Director SEKAB E-Technology, Örnsköldsvik)

### ***Raw material&Pretreatment***

11.15 - 12.00 **TBA**

12.00 – 13.00 **Lunch**

13.00 – 13.30 **Pretreating the material for hydrolysis** (Tommaso di Felice, Chemtex, Italy)

### ***Enzymes***

13.45 – 14.30 **How do the enzymes degrade the material?** (Liisa Viikari, University of Helsinki, Finland)

14.45 – 15.30 **Development of novel enzymes** (Ronald de Vries, Utrecht University, the Netherlands)

15.30 – 16.00 **Coffee**

16. 00 – 18.00 **Group exercise I**

20.00 ***Social activity (requires registration)***

## May 24

### *Microorganisms & Fermentation*

08.15 - 09.00 **Fermentation physiology** (Lisbeth Olsson, Chalmers University, Sweden)

09.15 – 10.00 **Metabolic pathways and thermodynamics** (Vasiliy Hatzimanikatis, EPFL, Switzerland)

10.00 - 10.30 *Coffee*

10.30 – 11.15 **Yeasts for conversion of multiple sugars to ethanol** (Laura Ruohonen, VTT, Finland )

11.15 – 12.00 **Stress tolerance** (Marie-Francoise Gorwa, Lund University, Sweden)

12.00 - 13.00 *Lunch*

### *The Process*

13.00 – 16.00 **Visits to**

**The Processum Biorefinery Cluster**

**The National Demonstration Plant for Lignocellulosic Ethanol** - operated by SEKAB  
( *organized as two groups which shift places at half-time*)

16.00 – 18.00 **Group Exercise II**

19.00 *Dinner (requires registration)*

## **May 25**

### ***Designing the plant***

08.15 - 09.00 **Flow sheeting and economic evaluation** ( Anders Wingren,SEKAB, Sweden)

09.15 - 10.00 **Pretreatment by-products and detoxification** (Leif Jönsson, Umeå University, Sweden)

10.00- 10.30 *Coffee*

### ***Environment & Economics***

10.30 -11 .00 **Environmental impacts** (Rainer Janssen, WIP, Germany)

11.15 – 12.00 **Where is the business?** - Panel discussion

12.00 – 13.00 *Lunch*

13.00 – 14.30 **Presentations of group exercises**

14.30 **Concluding remarks**

*Course organizers and sponsors*



**BIOREGS**



BIO4ENERGY

*Kempestiftelserna*