



Bioefficiency

Spring School on Next Generation Biomass Heat and Power Cogeneration

Are you interested in ...

Thermal pretreatment technologies for biomass fuel upgrading?

Fluidized bed and pulverized fuel technologies for efficient, dedicated biomass combustion?

An introduction on measurement techniques for flue gas and combustion by-products?

Corrosion and fouling of biomass boilers and mitigation measures?

Environmental sustainability and socio-economic dimensions of biomass utilization?

Steady-state and dynamic modeling of biomass CHP plants?

Research activities and industrial outlook for biomass combustion facilities?

Application of biomass ashes?

Register for Bioefficiency's Spring School and learn about:

Biomass properties · Torrefaction · Hydrothermal Carbonization · Steam Explosion · Fluidized Bed Combustion · Pulverized Fuel Combustion · Boiler corrosion and mitigation measures, furnace materials · Biomass ash utilization · Boiler and CHP plant modeling · Environmental and socio-economic impact of biomass utilization

Scope: An introduction to the state-of-the-art and research activities for efficient biomass combustion and biomass CHP plants

Dates: 2-5 April 2019

Location: Multimedia amphitheater, Central Library of National Technical University of Athens, 9, Heron Polytechniou str., 15780, Athens-Greece

Suitable for: Students interested in biomass utilization, early career researchers and professionals

Registration: Free to attend. Snacks and refreshments will be provided during the spring school.

To register, please visit http://www.lsbtp.mech.ntua.gr/BioSpringSchool/biof_sprschool_form

Application deadline: 31 January 2019

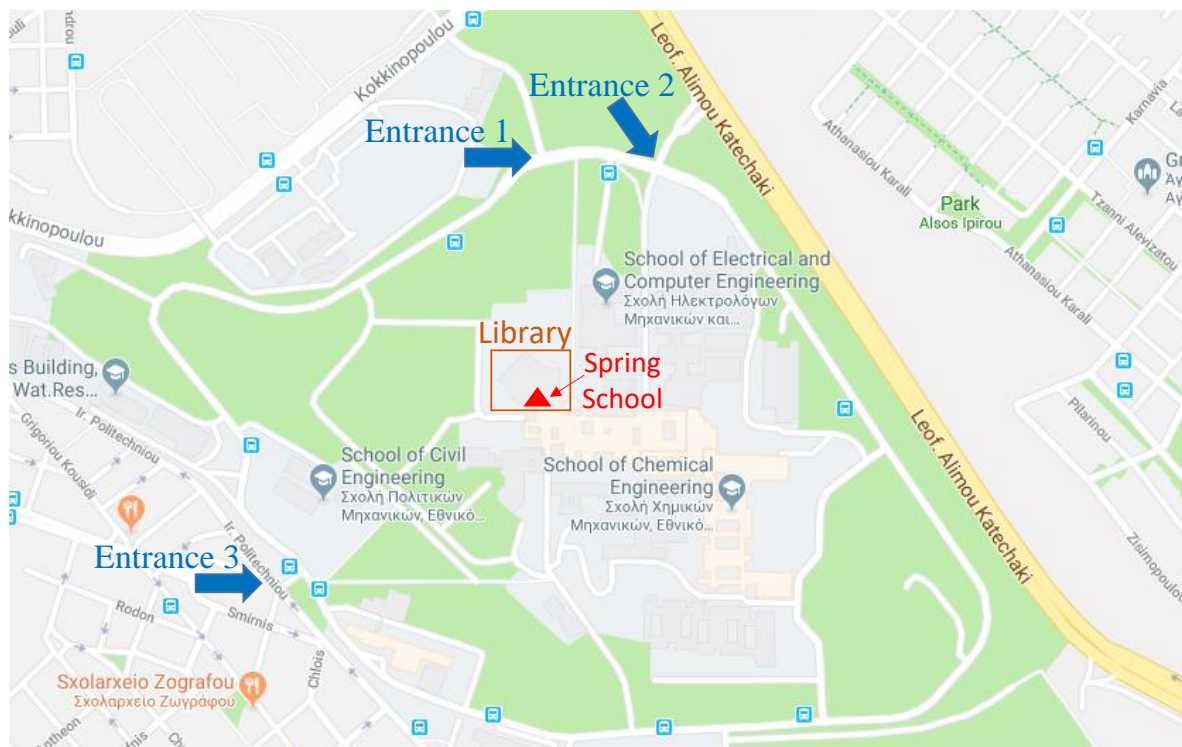
Spring School schedule

<i>Tuesday 2nd April 2019</i>		
09:00-09:15	Arrival at the Spring School location	
09:15-09:30	Introduction to the Spring School	NTUA
09:30-11:00	Biomass: logistics and properties	NTUA CERTH
11:00-11:30	Torrefaction	TNO
11:30-12:00	Hydrothermal Carbonization	TUM
12:00-13:00	Lunch	
13:00-13:30	Efficient utilization of biomass for products and energy: Metsä Fibre activities	Metsä Fibre
<i>Wednesday 3rd April 2019</i>		
09:00-10:00	Fluidized Bed combustion	Valmet VTT
10:00-11:00	Pulverized Fuel combustion	Ørsted TUM

11:00-12:00	Fouling and deposit formation	DTU
12:00-13:00	Lunch	
13:00-14:00	Corrosion and material issues for biomass boilers	Åbo Akademi
14:00-15:00	Flue gas emission measurements according to EU standards	NTUA
15:00-16:00	Laboratory tour	NTUA
<i>Thursday 4th April 2019</i>		
11:00-12:00	Biomass ash utilization	Laborelec
12:00-13:00	Steady-state and dynamic modeling of biomass combustion units	NTUA MHPSE
13:00-14:00	Lunch	
14:00-15:00	State-of-the-art and leap forward for biomass CHP plants	MHPSE

15:00-15:45	Steam explosion for biomass pretreatment	Valmet
16:00-17:00	Environmental performance aspects and Life Cycle Analysis (LCA)	NTUA CERTH
<i>Friday 5th April 2019</i>		
09:00-17:30	Field trip: Aluminium of Greece Cogeneration Plant at Aspra Spitia, Viotia	NTUA AOG
17:30-18:00	Spring school ending- Certificates of attendance	NTUA

Spring school location and access information



NTUA is located about 2.5 km away from the Katechaki station (metro line 3). From there, you may access NTUA *via* bus line 242. For more information, please visit <http://www.lsbtp.mech.ntua.gr/sites/default/files/Directions%20to%20NTUA.pdf>.

For ticket prices in the city of Athens, please visit <https://www.athenacard.gr/komistra.dev>. For bus and metro line info please visit <http://telematics.oasa.gr/en/#main> and <http://www.stasy.gr/>.

Spring School language and presentations

All presentations and discussions will be carried out **in English**.

Travel and accommodation expenses

Travel/transportation (excluding field trip cost) and accommodation expenses are not covered by the spring school organization. All necessary arrangements are on the responsibility of attendees. A few hotel choices are listed below:

Zappion Hotel (2-star hotel)
Price range: 40-75 euros/night
<https://www.zappionhotel.gr>

Elizabeth Hotel (2-star hotel)
Price range: 55-70 euros/night
<https://www.hotelelizabeth.gr/en>

Athinais Hotel (3-star hotel)
Price range: 60-80 euros/night
<https://www.athinaishotel.gr/>

The Golden Age Hotel (4-star hotel)
Price range: 125-155 euros/night
<https://hotelgoldenage.com/>

President Hotel (4-star hotel)
Price range: 80-120 euros/night
<https://president.gr/>

Certificates of attendance

Certificates of attendance will be provided to all attendees upon Spring School ending.

Do you have more questions?

Send your e-mails at dimgrim@mail.ntua.gr (Mr. Dimitrios Grimekis) and dmskouloudi@mail.ntua.gr (Ms. Despina Magiri – Skouloudi).

About the Bioefficiency project:

In order to meet the strict emission targets and energy efficiency goals in Europe, an increase in medium- to large-scale biomass utilization for combined heat and power (CHP) applications is expected. The *Bioefficiency* project aims to enhance the prospects for technology penetration by addressing several challenges associated with efficient biomass combustion, especially through handling ash-related issues. Fluidized-bed and pulverized-fuel combustion are of major interest in the project, with particular attention on understanding fly ash formation, deposit formation and corrosion, improving current biomass pre-treatment technologies and contributing to the field of biomass ash utilization. The ultimate goal is to enable energy recovery from low-grade, cheap biomass fuels in highly efficient CHP plants with live steam temperatures up to 600 °C, thus increasing resource efficiency. At the same time, a great effort is placed on evaluating and minimizing risks related to economic, socio-economic and environmental barriers. The program has established a strong collaboration between industrial and academic partners from different EU countries (Germany, Denmark, Finland, Greece, The Netherlands and Belgium) to increase the impact of the research output.

A holistic approach is ensured by combining modeling and experimental work. A few examples can be listed such as:

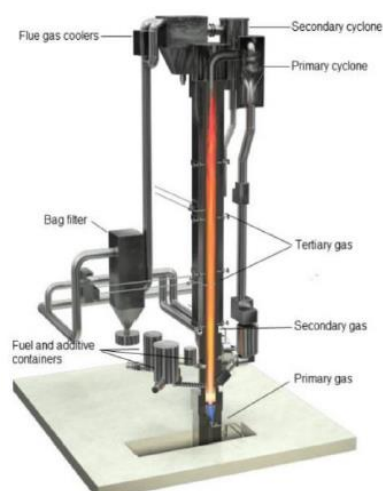
- Bench-scale facilities: pulverized biomass combustion (DTU, TNO), torrefaction (TNO) and hydrothermal carbonization (TUM), ash analysis and classification (Laborelec).
- Pilot-scale facilities: pulverized fuel combustion (TUM), fluidized-bed combustion (VTT), steam explosion (Valmet).
- Full-scale or pre-industrial scale facilities: pulverized fuel combustion at Avedore AVV2 and Studstrup SSV3 (Ørsted) and fluidized-bed combustion (Valmet).
- Modeling and simulation work through commercial and in-house software for biomass boilers (MHPSE), CHP plant concepts (NTUA, MHPSE) and life cycle analysis (NTUA).

Bioefficiency website:

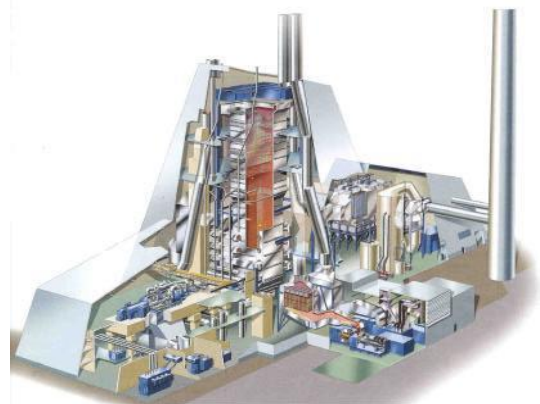
<https://www.bioefficiency.eu/>



*TNO's Torrefaction
Pilot-scale test rig*



*VTT's 50 kW Pilot-scale
CFB combustion test rig*



*Ørsted's Avedore AVV2
Large-scale CHP plant*

Project partners

**Technische Universität
München (TUM) - Coordinator**
Germany
<https://www.tum.de/>



Ørsted
Denmark
<https://orsted.com/en>



**Technical University of Denmark
(DTU)**
Denmark
<https://www.dtu.dk/>



**Technical Research Centre of
Finland (VTT)**
Finland
<https://www.vttresearch.com/>



Valmet Technologies
Finland
<https://www.valmet.com/>



Åbo Akademi University
Finland
<https://www.abo.fi/en/>



**National Technical University of
Athens**
Greece
<https://www.ntua.gr/en/>



ECN/TNO
The Netherlands
<https://www.tno.nl/en/focus-areas/ecn-part-of-tno/>



**Mitsubishi Hitachi Power Systems
Europe**
Germany
<https://www.emea.mhps.com/en/>



Engie Laborelec
Belgium
<https://www.laborelec.be/ENG/>



Metsä Fibre
Finland
<https://www.metsafibre.com/en/Pages/default.aspx>



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