

## CASE STUDY

### Scientific collaboration at an international level



Agnija Ieviņa is a 3rd year doctoral student at Riga Technical University Faculty of Material Science and Chemistry in Latvia.

In 2013, Agnija completed an 11 day visit to the SINTEF research institute in Oslo, Norway, to conduct experiments. Her trip was funded by the European Commission, as part of the BRISK Transnational Access initiative.

Agnija reports back on her experiences and knowledge gained while at SINTEF.



Figure 1: SINTEF's research institute in Oslo, Norway.

Nowadays, pyrolysis is considered to be one of the most promising technological solutions for obtaining biofuels, and for the production of valuable chemicals. It also seems to be an effective solution for utilising agricultural waste.

The main theme of my research work is in the areas of biomass pyrolysis and gasification, which I am investigating at the Institute of Applied Chemistry at Riga Technical University in Latvia. The Institute is regarded as a prestigious research centre and the main research themes of the scientific group are:

- Biomass characterisation and pre-treatment;
- Non-catalytical and catalytical pyrolysis and gasification of biomass and waste;
- Hydrothermal treating and liquefaction, as well as solvent mediated extraction and thermolysis of biomass and waste;
- Use of microwaves and ultrasonification in thermochemical conversion;
- Upgrading and development of applications of bio-oil from fast pyrolysis;
- Transport fuel by upgrading of fast pyrolysis liquid and hydrodeoxygenation of lipids;
- Heterogeneous catalysis of biodiesel synthesis from oils, fats and algae;
- Application of glycerol and biodiesel synthesis without glycerol;



Figure 2: Agnija pictured with the SINTEF team.

- New catalyst for biomass transformation processes into fuels and chemicals;
- Mixed fuels for transport and its quality assurance.

#### **BRISK—the perfect pathway to knowledge**

Last year I had the opportunity to widen my professional knowledge by collaborating with scientists at SINTEF in Oslo, Norway. Working with researchers at an international level is very important to me from a professional point of view, and the opportunity to participate in the BRISK project was invaluable to me. I was particularly keen to gain knowledge and experience of the latest fast pyrolysis technologies.

When using laboratory-scale facilities, it is often

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not possible to isolate the liquid and gas products obtained during the pyrolysis process, and the reaction products have to be analysed on-line by using the gas chromatography-mass spectrometry (GC/MS) system-coupled pyrolysis rig.

In accordance with the theme of my doctoral thesis, I chose to work with SINTEF's unique fixed-bed pyrolysis rig (pyrolyseanlegg) in Oslo to get more information about wheat straw pyrolysis products in gas phase, as well as bio-oil. The gas phase was separated from the obtained liquid product - bio-oil, and the influence of catalysts on the gas phase using a fixed-bed catalytic pyrolysis rig was analysed. Together, the information gained from SINTEF, combined with the data initially obtained from the Institute of Applied Chemistry in Riga provides excellent material for writing a publication.

#### Acknowledgements

I would like to thank the SINTEF research team at Oslo, who were highly professional and helpful at all times.

I would also like to thank my supervisor Professor Valdis Kampars, the Head of the Institute of Applied Chemistry at Riga Technical University, for his patience and encouragement in helping me to advance new objectives in my profession, and also to believe in myself.

#### About SINTEF

SINTEF is the largest independent research organisation in Scandinavia, having around 2,100 employees with an annual turnover of about €375m. It is a multidisciplinary organisation with over 90% of the income coming from bilateral industrial research and from participation in European or national research projects. SINTEF carries out contract research, as well as basic research, mainly in close collaboration with the Norwegian University of Science and Technology (NTNU) in Trondheim and the University of Oslo.

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#### Contact

For further details about how to apply to utilise SINTEF's facilities as part of the BRISK initiative contact:



Figure 3: While at SINTEF, Agnija researched pyrolysis products obtained from wheat straw (pictured above) in gas phase, as well as bio-oil (pictured below).



Torbjørn Gjervan

SINTEF

E: [torbjorn.gjervan@sintef.no](mailto:torbjorn.gjervan@sintef.no)

W: [www.sintef.no](http://www.sintef.no)