BRISK2
BIOFUELS RESEARCH INFRASTRUCTURE

NEWS
WWW.BRISK2.EU

Issue 2 *August 2018*

A SUMMER OF BIOFUELS SUCCESS

A group photo on the last day of the Biofuels Summer School at CERTH, Greece in June 2018. Photo courtesy of CERTH

It has been a busy first year for BRISK2, with two calls for transnational access completed and the project's first successful summer school at CERTH in Greece.

In this issue:

Since launch in June 2017, BRISK2 has been offering opportunities for biofuels researchers to access unique equipment and expertise across Europe. Sixty applications for transnational access (TA) have already been approved and biofuels researchers from across the world are now visiting BRISK2 facilities in Europe.

The next call closes on 1 October 2018 with more planned until 2022. Read about some successful applicants' experiences from page 8 onwards. Learn how to apply on page 12 and read on for an insight into the first BRISK2 Biofuels Summer School.

The *Biofuels Research Infrastructure for Sharing Knowledge,* funded by Horizon 2020 provides opportunities for biofuels researchers to access unique equipment and expertise across Europe. This project is truly international, with applications welcome from around the world. As Project Coordinator at KTH, it is a pleasure to be part of BRISK2.

Andrew Martin
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 731101.

BRISK
BIOFUELS RESEARCH INFRASTRUCTURE

BIOFUELS SUMMER SCHOOL 2018

Designed for….

Biofuels researchers

Industry professionals

Early Career Researchers

Attendees at BRISK2's first Summer School learnt about:

Biomass Characterisation · Pre-treatment · Fermentation · Gasification · Pyrolysis
Anaerobic Digestion · Combustion · Catalysis · Chemicals · Biorefinery & more

The first BRISK2 summer school in June 2018 offered a thorough introduction to biofuels production.

The event was organised by CERTH and Aston University and took place over three days at CERTH, Thessaloniki in Greece from Wednesday 20th June 2018 toFriday 22nd June 2018. It was free to attend with refreshments and lunch provided.

Fifty places were made available. 87 registrations were received, and more than 40 delegates attended as well as a number of BRISK2 expert speakers.

Almost half of the participants were already working or studying in Greece. Seven had travelled from Turkey and the rest included a mix of biofuels students and researchers from across Europe. Early career researchers, industry professionals and established biofuels experts looking to expand their knowledge in other fields came together to make this a diverse international event.

The summer school offered a packed programme, with days dedicated to thermal conversion technologies, biological conversion and biorefineries. The event was capped with an awards ceremony and tour of CERTH facilities.

Aston University
Birmingham

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

BIOFUELS SUMMER SCHOOL

BRISK2 experts delivered a series of lectures and workshops covering topics such as biomass characterisation, pre-treatment fermentation, anaerobic digestion, pyrolysis, combustion, catalysis and chemicals, biorefineries and process integration and proteins. The event also provided an excellent opportunity to network with established bioenergy experts from academia and industry.

Photographs courtesy of CERTH & Aston University.

PROGRAMME AND SPEAKERS

Biofuels Summer School 2018—CERTH, Greece

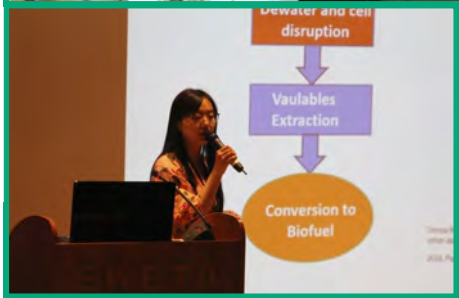
Wednesday 20 June 2018—Biological Processing		
09.00	**Welcome & Introduction**	Andrew Martin KTH Kyriakos Panopoulos CERTH
09.30	**Biomass Characterisation & Feedstocks**	Norbert Kienzl – BE2020+ and Wim Mulder – Wageningen Research
11.00	**Pre-treatment**	Florbela Carvalheiro - LNEG
12.30	*Lunch*	
13.30	**Fermentation**	Francisco Girio - LNEG
15.00	*Refreshments*	
15.30	**Anaerobic Digestion**	Andrea Lanzini - Politecnico di Torino
17.00	**CASE STUDIES**	Katie Chong, Bernd Wittgens, Kyriakos Panopoulos
Dinner and accommodation at delegates' own choice		
Thursday 21 June 2018—Thermal Processing		
09.00	**Gasification**	Kyriakos Panopoulos—CERTH and Wiebren de Jong - TU Delft
10.30	*Refreshments*	
11.00	**Pyrolysis**	Katie Chong - Aston University
12.30	*Lunch*	
13.30	**Combustion**	Stefan Retschitzegger - Bioenergy 2020+
15.00	*Refreshments*	
15.30	**Catalysis and Chemicals**	Eleni F Iliopoulou —CERTH on behalf of Angelos Lappas
17.00	**CASE STUDIES**	Katie Chong, Bernd Wittgens, Kyriakos Panopoulos
Dinner and accommodation at delegates' own choice		
Friday 22 June 2018—Biorefineries		
09.00	**Integration**	Nicolaus Dahmen – KIT and Bernd Wittgens - SINTEF
10.30	*Refreshments*	
11.00	**Proteins**	Wim Mulder - Wageningen Research
12.30	*Lunch*	
13.30	**CASE STUDIES Presentations**	Katie Chong, Bernd Wittgens, Kyriakos Panopoulos
15.00	**Prize presentations & Closing Address**	Aston University and CERTH
	Tour of CERTH facilities	CERTH
17.00	*End of Summer School*	

BIOFUELS SUMMER SCHOOL

Throughout the summer school, delegates worked together in small groups to create a case study presentation, applying the knowledge gathered during the course programme.

The speakers and judges agreed that the presentations were of an exceptionally high standard.

Many focused on conversion of municipal solid waste, with prizes awarded to the best presentations. All participants received a certificate of attendance.



JOINT RESEARCH ACTIVITIES UPDATE

BRISK2 partners meet in Thessaloniki, Greece in June 2018.

Alongside the primary activity of Transnational Access, BRISK2 partners are collaborating on Joint Research Activities.

These will yield an improvement in process flexibility and reliability, developing new approaches to biofuels production. Assimilated data and knowledge will provide input for simulation tools and will be used in a broad spectrum of analyses.

BRISK2 partners met again to discuss these activities in June 2018 at the Executive Committee (ExCo) and General Assembly meetings, which were organised in advance of the Summer School at CERTH, Thessaloniki Greece. All partners are now completing a comprehensive technology assessment to map the infrastructure's capabilities.

Preparations for a 'round robin' are also underway, which will see the same experiments replicated in facilities across the infrastructure.

BRISK2's joint research activities include:

- Protocols, databases and benchmarking
- Integrated multi-scale characterisation of new feedstocks for thermal and biological conversion processes
- Advanced measurement techniques for enhanced process flexibility and reliability
- Innovative biorefining approaches for sustainable bio-based products
- System simulation tools for comprehensive modelling of biomass conversion and biorefinery

TRANSNATIONAL ACCESS - UPDATE

BRISK2 has completed two calls for applications for transnational access (TA).

Sixty applications for TA have now been approved and visits from biofuels researchers to BRISK2 research installations are taking place across Europe. Case studies from some recent visits are available on page 8.

Above: BRISK2 TA visitor Ane Caroline Borges at Aston University, June 2018 with Dr Jude Onwudili (lecturer in Chemical Engineering)

Applications will be welcome continually until 2022. Biofuels researchers can apply to BRISK2 via the website www.brisk2.eu at any time whilst the project is active.

Above: BRISK2 TA visitor Aysel Elik at LNEG, April 2018

Applicants must contact the facility of their choice to develop a realistic work plan before submitting an application to the website. Applications are pooled for assessment by an independent panel of biofuels experts. The User Selection Panel (USP) meets a twice a year in each April and October.

Read on to discover more about the biofuels research opportunities with BRISK2.

APPLY FOR TRANSNATIONAL ACCESS NOW!
visit www.brisk2.eu

Pool Deadline	Selection Panel	Notification	Access Period
1 October 2018	October 2018	15 November 2018	Nov—Apr 2019
1 April 2019	April 2019	15 May 2019	May-Oct 2019
1 October 2019	October 2019	15 November 2019	Nov—Apr 2019
1 April 2020	April 2020	15 May 2020	May– Oct 2020

CASE STUDY—DIANA OLIVIERA

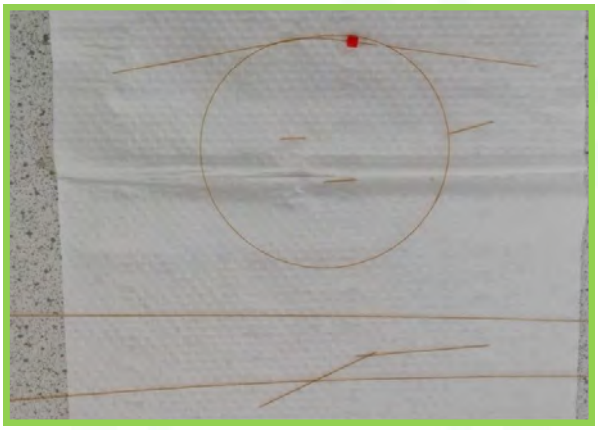
Dr Diana Oliviera from University College Cork was one of the first researchers to complete a BRISK2 transnational access visit. Her successful proposal took her to LNEG in January 2018 to apply Capillary Electrophoresis (CE) to dairy waste protein profiles.

The production of traditional dairy products, such as cheese, generates large quantities of low-value side-streams (e.g. whey). Due to its high levels of organic matter, they present processing and environmental challenges. To address this, a range of whey-based ingredients are produced for food and non-food applications, and within a biorefinery concept. Finding new solutions for low-value side-streams is part of a strategic path towards more sustainable production.

Of the BRISK2 partners, the BBRI facility from LNEG in Portugal provided the expertise and advanced analytical instrumentation required, specifically Capillary Electrophoresis (CE), which is currently missing within UCC's research group. A collaboration between DPTC-UCC and BBRI-LNEG, under the supervision of Dr. Luisa Roseiro, was proposed and successfully granted.

The proposal focused on the development, optimisation and application of an advanced analytical methodology by CE for dairy-waste protein profiles. Dairy by-products have a complex matrix which makes characterisation

Agilent HP3D CE with diode array (DAD) detection



Troubleshooting—CE capillary breakage

difficult. Protein analysis can be complicated, however CE has applications, including biochemical analysis. Therefore, the development of a successful analytical methodology for the rapid identification and quantification of whey-proteins in dairy side-streams gives the dairy industry the opportunity to engage in more sustainable strategies for low-value side-streams.

The work developed at BBRI-LNEG included sample preparation and method setting, troubleshooting and optimisation, in addition to sample analysis. The necessary equipment, materials and facilities were provided as well as training and guidance.

Overall, a method for whey protein identification and quantification was successfully developed and optimised, and the objectives of the work package proposed were fully achieved. The results have shown the potential of CE, not only for protein analysis but also for lactose and potentially specific bioactive lipids, such as phospholipids. This requires further investigation and suggests new collaboration opportunities in the future.

Dr Diana Oliviera is a post-doctoral researcher at The Dairy Processing Technology Centre (DPTC) at University College Cork (UCC), Ireland — a center of excellence for dairy processing research and innovation.

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RIG FOCUS—ECN's WOB GASIFIER

Daya Pandey (left) and Ioannis Katsaros (right) from Brunel University (UK) were the first transnational access visitors to ECN part of TNO, pictured here running an experiment on a bubbling fluidised bed gasifier with Johan Kuipers (centre).

In February and March 2018, they tested wood and poultry litter co-gasification at the WOB bubbling fluidized bed reactor. Daya's case study is on page 10 and you can read more of his work on Poultry Litter Gasification in a Fluidized Bed Reactor via Research Gate.

ECN and TNO Join Forces

An energy system based renewable sources is as important as ever. That's why the Energy Research Centre of the Netherlands (ECN) and The Netherlands Applied Energy Organisation (TNO) merged on 1 April 2018 to create ECN part of TNO. Together they will better help industry become more sustainable, innovative and competitive. Visit www.brisk2.eu to access ECN part of TNO's unique research facilities for your own biofuels studies. Applications are open now.

ECN part of TNO's second BRISK2 visitor was Yan Moiseev from Frederick University in Cyprus. Yan studied the performance of olive residue, a high potential biomass feedstock in the southern regions of Europe, for its thermochemical valorisation via gasification in the WOB gasifier. Yan takes away a nice set of experimental data as well as an adventure in The Netherlands.

This summer, Yeshui Zhang from University College London also visited the WOB gasifier, testing PE and wood at different operating conditions.

We hope that Yeshui has enjoyed a pleasant and productive stay at ECN part of TNO in the Netherlands, and we look forward to reading her case study soon.

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CASE STUDY—DAYA PANDEY

I am a postdoctoral research fellow at the Institute of Energy Futures at Brunel University, London.

My research focuses on exploitation of the fundamental thermodynamic principles of waste heat recovery, with an emphasis on the thermochemical conversion processes (combustion, gasification and pyrolysis) of animal feedstock and energy integration in order to explore further their potential for application to combined heat and power technologies.

I visited ECN with BRISK2 to work on a bubbling fluidized bed reactor (WOB setup, up to 1 kg/h capacity). I investigated the effect of temperature and equivalence ratio on the gas compositions and yield while gasifiying and co-gasifying poultry litter and wood.

Experiments were carried out at temperatures of 700-725-750°C and different equivalence ratios (0.20-.025-0.30). The flow rate of air, and N_2 was adjusted to ensure that the bed was properly fluidized. At higher ER, the N_2 flow rate was decreased while increasing the air flow rate to keep constant the fluidization velocity.

Considering the fact that my research group doesn't have the experimental facility (gasifier) in-place, a visit to ECN through BRISK2 has provided significant data which will be helpful in developing a comprehensive model.

Agglomerate in the bed

SPA sampling—Daya Pandey and Ioannis Katsaros

The possibility of getting and analysing tar samples was also a valuable aspect for consideration.

The application process for Transnational Access (TA) was very simple and informative. I approached Dr. Guadalupe Aranda and Dr. Lydia Fryda to use the experimental facility of Energy Research Centre of the Netherlands (ECN) through the BRISK2 transnational access (TA) grant.

Prior to submitting my application to the BRISK2 user selection panel (USP) for review, I had a detailed discussion with my hosts about the work plan and with Johan Kuipers (ECN) about executing the task. Once we finalized the plan, I prepared the proposal and submitted it to the BRISK2 website for approval.

Continued ….

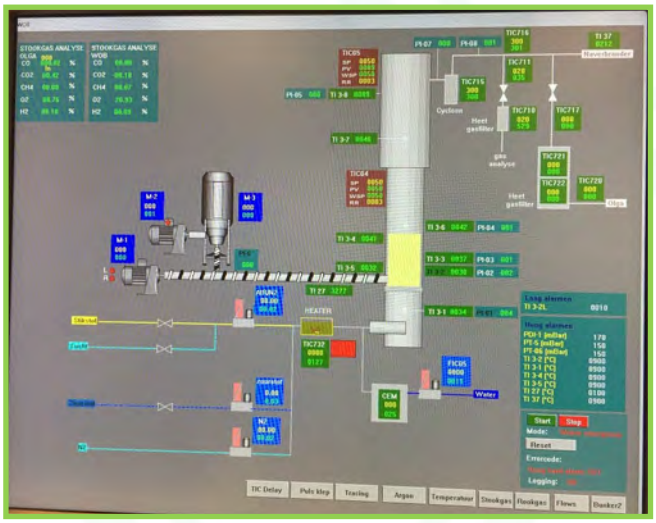
CASE STUDY—DAYA PANDEY

I submitted my proposal October 2017 and received an approval for my project in December 2017. I visited ECN from 26 February to 5 March 2018. The intended initial experimental plan had to be modified during the visit due to the bed agglomeration issues observed at higher gasifier temperature.

To overcome the bed agglomeration issue, we modified the original plan to compare both gasification and co-gasification of poultry litter with wood, which we executed that successfully. Now, I am back at Brunel University London with experimental data that I am currently processing. We aim to publish our research and findings in high impact journals in the near future.

As a young researcher it was an exciting experience to work with experienced researchers in the gasification area, learning the limitations of gasifying feedstock with high ash content. Although, we were able to perform most of the tests we planned nevertheless, it would have provided greater insight if TA visit could have covered NH_3, HCl, and agglomerate analyses. Furthermore, tests with other types of bed materials like ilmenite or olivine or bauxite might be an interesting follow-up work.

Overall, BRISK2 is an excellent initiative towards fostering intra-European research cooperation and transfer of knowledge among the researcher working in the area of biological and thermal biomass conversion processes. In addition, my visit to ECN has catalysed a scientific and personal network that probably will help us in strengthening our bilateral projects and mobility in the near future.



Gas monitoring and control system

Acknowledgements:

The financial support for this project, provided by the EU project Biomass Research Infrastructure for Sharing Knowledge (BRISK2), is gratefully acknowledged.

I would like to thank the host team formed by Guadalupe Aranda, Lydia Fryda and Johan Kuipers for their consistent support, a very special thanks to the coordinator of the BRISK2 Transnational Access project (KTH in Sweden), and USP members.

I would also like to thank my mentor Prof. Savvas Tassou, Brunel University London; my colleague Ioannis Katsaros and Alen Horvat from the University of Limerick, Ireland for joining me during this experimental campaign and helping in tar sampling and analysis and as a discussion partner.

Daya Pandey is from the Institute of Energy Futures (IEF) at Brunel University, London, UK. The institute extensively researches decorbonising the energy sector. He visited ECN through BRISK 2 in 2018.

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HOW TO APPLY FOR TRANSNATIONAL ACCESS

The call for for Transnational Access applications is open now. Biofuels researchers from industry and academia are welcome to apply via the BRISK2 website at www.brisk2.eu.

Applications for TA must fulfil strict eligibility criteria:

- The minimum level of qualification required is Bachelor of Science (BSc) or equivalent in a relevant Science or Engineering discipline.
- Applications can only be made to host organisations within the BRISK2 network and outside that of the applicant's own country and organisation
- Priority will be given to applicants who do not normally have access to similar research facilities within the country they are based
- Priority will be given to first time applicants
- Applications are welcome from across the world. However, the majority of grants will be available to EU member and Horizon 2020 associated states.

BRISK2 Application Steps

1. **Contact** your preferred BRISK2 project partner and discuss the viability of your proposal. Contact information is on page 10.

2. **Complete** the Transnational Access Application Form available at www.brisk2.eu/how-to-apply under consultation with your BRISK2 project partner.

3. **Submit** the completed PDF form via the BRISK2 website.

Choose from
15 partners
55 installations
11 countries

Individuals or teams of researchers are eligible to apply. BRISK2 will cover the cost of travel and subsistence up to the value of €1200 per visit

Transnational Access is coordinated by KTH

Applications can be made online. General enquiries can be sent to:
Mahrokh Samavati at brisk2@energy.kth.se

BRISK2 SPONSORS EUBCE 2018

BRISK2 sponsored the 26th European Biomass Conference and Exhibition from 14 -18 May 2018 in Copenhagen, Denmark.

Right: Stefan Retschitzegger from Bioenergy 2020+ and Pippa Try from Aston University, who manned the BRISK2 stand along with Daniel Nowakowski

Above right: Ian Watson from Glasgow University, and member of the BRISK2 User Selection Panel with Pippa Try

Left: Linneborn Prize Winner, Douglas C Elliot with Aston University's Dr Daniel Nowakowski

Below: Martin Hitzl from Ingelia who visited BE2020+ in 2014 with the first BRISK, pictured with Stefan Retschitzegger

BRISK2 SPONSORS EUBCE 2018

BRISK2 partners also attended EUBCE 2018 to deliver presentations and posters, with many stopping by the stand to say hello.

Anti-Clockwise from left: CERTH's Tzouliana Kraia and Kyriakos Panopoulos; CENER's Ines del Campo; early career researchers discover BRISK2; ENEA's Nadia Cerone and Francesco Zimbardi.

BIOENERGY NEWS

The Iberoamerican Congress on Biorefineries is now in its 4th edition, returning to Jaén in Spain in 2018.

SIADEB members as well as the Iberoamerican community on Biorefineries are invited to gain new knowledge about developments underway across Europe and Latin American Countries. A full 3 day programme will take place on Wednesday 24th October —Friday 26th October 2018. BRISK2 expert Francisco Girio from LNEG, president of the SIADEB, plenary speaker and member of the organising committee will be in attendance. Keynote speakers from around the world will be attending to present on topics including:

- Advances in biorefineries
- Pre-treatment and fractionation
- Lignin production and applications

Registration is now open at the 4 CIAB conference website.

SAVE THE DATE—Pilots4U 'Horizon Scan' Workshops—Equipping Europe for bio-based innovations

BRISK2 is part of Pilots4U, which has set up an easily accessible database of open-access pilot and demonstration facilities for the European bio-economy. The project has also carried out an online survey to understand the equipment and related services required by users of open-access pilot facilities.

Pilots4U is currently performing a gap analysis to understand where the EU may have over/under capacity and vulnerabilities now and in the near future.

Interactive workshops will bring together industry, researchers and experts from pilot plants to discuss the state of the European open-access pilot and demonstration infrastructure for the bio-economy. It will also examine the different opportunities to improve service delivery and interconnection between open-access facilities.

- 26 September 2018 1-6pm, Botanical Garden of Torino, Italy
- 16 October 2018 1-6pm, Toulouse, France
- 22 October 2018 12-5pm, VTT, Espoo, Finland
- 7 November 2018, 1-5.15pm, Sheraton Hotel, Brussels, Belgium

For more information visit:

www.biopilots4u.eu/events

BIOENERGY NEWS

ABC-Salt's New Research

A new venture in biofuels research is underway, focusing on advanced biomass catalytic conversion to middle distillates in molten salts, in a H2020 project otherwise known as ABC-Salt.

ABC-Salt partners at project kick off, University of Groningen

ABC-Salt launched in April 2018 funded by Horizon 2020's Research and Innovation Programme. It aims to have a positive effect upon the biomass, biofuel and transport industries by developing new technologies that will reduce dependence on unsustainable fossil fuels.

Eight inter-related work packages have been developed to tackle the challenge of liquefaction and the subsequent catalytic hydro-pyrolysis of biomass in a molten salt environment, followed by the catalytic hydro-deoxygenation of the vapour phase using suitable catalysts to obtain a hydrocarbon suitable for use as a middle distillate biofuel.

ABC-Salt will then operate an integrated lab scale reactor for over 100 hours to provide validation of the whole process, bringing this technology to readiness level 4.

The project includes technical aspects, such as substrate flexibility, biomass liquefaction and hydro-pyrolysis in molten salts, as well as socio and techno-economic viability studies to ensure the future deployment of technologies is suitable.

Integration studies will consider substrate available, supply chains, future and end users and the overall economic sustainability of the process. The holistic approach of this project considers the full value chain with outcomes effectively communicated.

A number of ABC-Salt Summer Schools and open workshops will take place, hosted by project partners across Europe to maximise the impact of the project.

A number of ABC-Salt Summer Schools and open workshops will take place across Europe

ABC-Salt's first open event will be a summer school in 2019 at Aston University in the UK.

The project's first newsletter is coming soon, with more information coming to ABC-Salt's new project website soon.

Biofuels researchers, industry stakeholders, NGOs and students are invited to find out more at www.abc-salt.eu.

ABCSalt
Advanced Biomass Catalytic Conversion

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement 764089

Fuels of the Future

OPEN WORKSHOP

Ideal for: Industry Stakeholders · Biofuels R&D Innovators

Strategic Energy Services · NGOs · Commercial Energy Consumers

Energy System Integration of Bio-Based Fuels

- ✓ Energy products of the future - 2050
- ✓ Research and innovation needs
- ✓ Integration of fuel production into a European Energy System

AMBITION has received funding from the European Union's Horizon 2020 Research and Innovation Programme Under grant agreement no 731263

Bio4Fuels is funded by The Research Council of Norway Project number 257622

Thursday 13th September 2018, 9am-4pm

Location: Radisson Blu Royal Garden Hotel, Trondheim

Register at www.ambition-research.eu/workshops

INTERNATIONAL BIOENERGY EVENTS

BRISK2 SPONSORS ECCRIA 2018

BRISK2 will be sponsoring the 12th European Conference on Fuel and Energy Research and its Applications in Cardiff in September, bringing together bioenergy researchers from academia and industry.

Prof. Jaap Kiel from ECN part of TNO will be leading a BRISK2 session, including presentations from ECN's Berend Vreugdenhil and Pedro Abelha.

For more information on BRISK2's presence at ECCRIA 2018, contact Pippa Try at p.try@aston.ac.uk.

12th ECCRIA Conference
4-7 September 2018
Cardiff,
United Kingdom
www.eccria-conferences.org

Sponsored by
BRISK
BIOFUELS RESEARCH INFRASTRUCTURE

AMBITION Workshop - Energy System Integration of Bio-Based Fuels
September 13, 2018—Trondheim, Norway

Advanced Biofuels Conference
September 18-20, 2018 - Gothenburg, Sweden

Environmental Chemistry and Engineering
September 20-22, 2018—Berlin, Germany

Renewable Energy & Emerging Technologies
October 5-6, 2018—Barcelona, Spain

Argus Biofuels 2018
October 8-11, 2018 - London

Biofuels International Conference & Expo
October 10-11, 2018—Berlin, Germany

International Scientific Conference on Energy and Climate Change
October 10-11, 2018—Athens, Greece

ISWA 2018 World Congress
October 22-24, 2018—Kuala Lumpur, Malaysia

7th International Conference on Sustainable Energy and Environment
November 28-30, 2018 - Bangkok, Thailand

Biofuels and Bioenergy for Expanding a New Horizon
December 3-5, 2018—Valencia, Spain

5th Latin American Congress on Biorefineries from Laboratory to Industrial Practice
January 7-9, 2018—Concepcion, Chile

Biomass Conference & Expo
March 18-20, 2018—Georgia, USA

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Contributions for the next BRISK2 newsletter are welcome. Please submit articles with high resolution photos to:

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This newsletter was produced by the European Bioenergy Research Institute at Aston University, UK on behalf of BRISK2, EU Grant Agreement number 731101. Any opinions or material contained within this newsletter are those of contributors and do not necessarily reflect the views of EU Horizon 2020 or Aston University.