



Networks in Industrial Biotechnology & Bioenergy (BBSRC NIBB)

Activities update, May 2016



Overview

In 2013-14, BBSRC, with support from EPSRC, committed £18M to fund 13 unique collaborative Networks in Industrial Biotechnology and Bioenergy (BBSRC NIBB). The BBSRC NIBB launched in January 2014, so most of the Networks are about half way through their planned duration.

The BBSRC NIBB are fostering collaborations between academia, industry, policy makers and NGOs in order to find new approaches to tackle research challenges, translate research and deliver key benefits in IBBE. Each Network has a particular focus area, mainly within the UK, but with interest in building international links.

These multidisciplinary networks are driving new ideas to harness the potential of biological resources for producing and processing materials, biopharmaceuticals, chemicals and energy. The Networks provide Proof of Concept funding, Business Interaction Vouchers, are free to join, and are open to new members.

As of the end of March 2016, the BBSRC NIBB collectively represent approximately **2340 UK-based academic members** and have engaged with around **630 companies**.

This Activities update highlights upcoming Network events and showcases the most recent Proof of Concept and Business Interaction Vouchers that have been funded through the BBSRC NIBB.

This update will be produced at regular intervals and made available on our BBSRC NIBB webpage www.bbsrc.ac.uk/bbsrcnibb

Further details relating to the individual BBSRC NIBB can be found on their individual websites or the BBSRC webpage detailed above.

Upcoming BBSRC NIBB events – May – December 2016

- 23 June – HVCfP Annual Meeting in York
- 30 June – 1 July – NPRONET & BioCatNet Early Career Researcher event in Warwick
- 30 June – 1 July – IBTI event involving P2P LBNNet and FoodWasteNet in Manchester
- 4-5 July – ADNET Early Career Researcher event in Birmingham
- 6-7 July – Overcoming Cellular Barrier for IBBE. Joint event BioCatNet, BioProNET & CBMNet in Birmingham
- 14-15 July – IBCarb & PHYCONET joint event Algal Polysaccharides in Edinburgh
- 24 July – C1Net 2nd Conference in Nottingham
- 10 August – NPRONET/ sLoLa event
- 1 September – FoodWasteNet meeting on catalysis and food waste valorisation in Birmingham
- 1-2 September – PHYCONET Annual Conference at the Centre for Process Innovation, nr. Redcar
- 6-7 September – BioProNET 2nd Early Career Researcher event in Brighton
- 15-16 September – CBMNET Early Career Researcher event
- 18-20 September – IBCarb How to commercialise your research and set up a glycobio-tech start up at Windsor Park
- 19-20 September – ADNetwork Electrochemistry Workshop – Newcastle (tbc)
- 28-29 September – LBNNet Biorefinery in the UK
- September/October – BioCatNet mid-term event in Manchester (tbc)
- 19-20 October – BioProNET 3rd Annual meeting in Nottingham
- 20 October – P2P Satellite Event at EFIB 2016
- 25-26 October – NPRONET Community Meeting in Manchester
- 1-2 November – PHYCONET & HVCfP Workshop in Nottingham
- Late Autumn – FoodWasteNet event on valorisation of cereals & bakery waste
- 15-17 November – CBMNet Short Course in Industrial Biotechnology
- Late Autumn – FoodWasteNet joint event with Campden BRI
- 8-9 December – CBMNet Event Social and Political challenges for the Bioeconomy in Sheffield
- 18-20 December – Metals in Biology Community Meeting in Durham

Upcoming BBSRC NIBB funding calls 2016

- Now – PHYCONET BIV call open – application deadline: 15 June 2016
- Now – IBCarb PoC call open – application deadline: 30 June 2016
- Now – PHYCONET Training & Conference funding (for events starting 1 October – 30 December) application deadline: 1 August 2016
- 27 July – HVCfP next BIV call closes. These run quarterly until January 2018
- 1 August – FoodWasteNet BIV call closes
- 8 September – HVCfP POC call 5 closes
- 3 October – BioProNET BIV call opens
- 24 October – FoodWasteNet BIV call closes

Details of Proof of Concept projects awarded by the BBSRC NIBB between July 2015 and March 2016 can be found in **Annex 1**. Older awards are listed in the September 2015 Activities update (www.bbsrc.ac.uk/documents/1509-bbsrc-nibb-newsletter-pdf)

Proof of Concept projects awarded by the BBSRC NIBB are a maximum of 12 months in duration, £100k value and funds are paid by BBSRC at FEC 80 %.

Details of Business Interaction Vouchers awarded by the BBSRC NIBB between July 2015 and March 2016 can be found in **Annex 2**. Older awards are listed in the September 2015 Activities update (www.bbsrc.ac.uk/documents/1509-bbsrc-nibb-newsletter-pdf)

Business Interaction Vouchers are a maximum of 6 months in duration, and up to £10k in value and are designed to facilitate interactions between academics and industrialists.



www.bbsrc.ac.uk/bbsrcnibb

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Annex 1: BBSRC NIBB Proof of Concept projects awarded between July 2015 to March 2016

| Network | PoC title | Primary Investigator | Institution |
|-----------|--|--------------------------|------------------------------------|
| Biocatnet | Establishing the potential of biosynthetic urea--synthetases as industrial biocatalysts | Christophe Corre | University of Warwick |
| Biocatnet | Predictive sequence-activity landscapes of biocatalysts via random forests and deep learning | Douglas Kell | University of Manchester |
| Biocatnet | Bio CO ₂ | Ray Marriott | Bangor University |
| Biocatnet | 'Smart' amine donors for efficient and cost-effective scale-up of biotransformation employing ω -transaminases | Elaine O'Reilly | Manchester Metropolitan University |
| BioProNET | Analysis of host cell protein impurities using in silico approaches | Mark Wass | University of Kent |
| BioProNET | Molecular Imprinting for Sustainable Downstream Processing of Biopharmaceuticals | Gyorgy Szekely | University of Manchester |
| BioProNET | Hijacking intracellular storage bodies to create a novel mammalian cell-based expression system for the production of hard-to-express proteins | Andrzej Marek Brzozowski | University of York |
| BioProNET | Bioreactor design space identification with product quality constraints | Cleo Kontoravdi | Imperial College London |
| BioProNET | Expanding production time of mammalian cell cultures for biotechnological applications | Martin Michaelis | University of Kent |
| C1Net | In-situ Multiphase Compartmentalised Substrate Shuttle Bioreactor for Protein and Platform Chemicals | Richard Dinsdale | University of South Wales |
| C1Net | Maximising reaction productivity through protein scaffolding with cohesion-dockerin domains | Nigel Mintonl | University of Nottingham |
| C1Net | A synthetic approach to bioconversion of carbon dioxide to formic acid | Frank Sargent | University of Dundee |
| C1Net | Novel aerobic chassis for the conversion of mixed CO/CO ₂ feedstocks | Klaus Winzer | University of Nottingham |

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| C1Net | Optimizing low cost C1/C2 compound production and fermentation from biomass solid waste | Phillip Wright | University of Newcastle |
| CBMNet | Identifying and characterising protective lipid changes under solventogenic stress | Alan Goddard | University of Lincoln |
| CBMNet | Engineering Exosome Production by CHO Cells | David James | University of Sheffield |
| CBMNet | A potent synthetic biology strategy for increasing transporter-mediated terpenoid efflux from E. coli | Douglas Kell | University of Manchester |
| CBMNet | Plants as Nanoparticle Producers | Frans Maathius | University of York |
| CBMNet | Identification of malodour precursor transporter inhibitors using chemical & structural biology | Gavin Thomas | University of York |
| FoodWasteNet | Assessment of Ice Cream Waste as a Feedstock for Higher Value Applications | Neil Bruce | University of York |
| FoodWasteNet | Assessment of Food Waste Feedstocks for the Production of Novel Antifungal Compounds through Fermentation | Jared Cartwright | University of York |
| FoodWasteNet | Supercritical CO2 extraction & enzyme-modification of leaf waxes from brassica waste to produce novel film antitranspirants for increasing crop drought tolerance | Peter Kettlewell | Harper Adams University |
| HVCfP | Harnessing Natural Genetic Diversity to Drive the Industrial Synthesis of Betalains for human health and nutrition | Samuel Brockington | University of Cambridge |
| HVCfP | Isolation/Characterisation/Activity screening of a high value bioactive complex of proteoglycans from a high exopolysaccharide (EPS) forming strain of microalgae. | Paul Knox | University of Leeds |
| HVCfP | Evaluation of cambial meristematic cell cultures as a source of functional phytochemicals for the personal care industry | Gary Loake | University of Edinburgh |
| HVCfP | Small molecule-mediated manipulation of specialized metabolism in plant cell cultures | Anne Osbourn | John Innes Centre |
| HVCfP | Engineering synthetic pathways for the production of pharmaceutical sciadonic acid in transgenic <i>Camelina sativa</i> | Olga Sayanova | Rothamsted Research |

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| IBCarb | Generation of DNA-encoded carbohydrate libraries using biocatalysis | Sabine Flitsch | MIB/University of Manchester |
| LBNet | Screening for new ligninase activities | Neil Bruce | University of York |
| LBNet | LBNet Feedstock Resource | Claire Halpin | University of Dundee |
| LBNet | Clean and energy-efficient processing of ligno-cellulosic renewable biomass suitable for the Personal Care and High Performance materials markets: "Explosion to Implosion" | Keith Waldron | Institute of Food Research |
| LBNet | Valorisation of lignocellulosic biomass using anaerobic fermentation | Klaus Winzer | University of Nottingham |
| NPRONET | A metabolomics approach to antimicrobials discovery in seaweeds | Ruth Airs | Plymouth Marine Laboratory |
| NPRONET | The discovery and characterisation of natural product derived small molecule compounds as novel anti-leishmanials | Paul Denny | Durham University |
| NPRONET | The role of Pseudomonas secondary metabolism in potato scab biocontrol | Jacob Malone | University of East Anglia/John Innes Centre |
| NPRONET | Translational control of antibiotic production in an industrially important streptomycete | Colin Smith | University of Surrey |
| NPRONET | Investigating the role of ultrasonication on natural product yield in Streptomyces bacteria. | Andrew Truman | John Innes Centre |
| P2P | Evaluation of the thermo-mechanical pulping of biomass to facilitate release of fermentable sugars for advanced biofuel production | Adam Charlton | Bangor University |
| P2P | BREATHABOARD: Developing and up-scaling an innovative cropbased alternative to gypsum plasterboard | Peter Walker | University of Bath |
| PHYCONET | A molecular toolbox to commercialise cyanobacteria: synthetic genetic sensor-regulator circuits for increased yields of phycobiliproteins | Alistair McCormick | University of Edinburgh |
| PHYCONET | Production of protein antibiotics in the algal chloroplast | Saul Purton | University College London |

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| PHYCONET | Engineering of supramolecular assemblies for enhanced high-value compound synthesis in the <i>Chlamydomonas reinhardtii</i> chloroplast | Colin Robinson | University of Kent |
| PHYCONET | Tetramed: Spent media from <i>Tetraselmis</i> cultivation as a source of new bioactives | Michele Stanley | SAMS |

Annex 2: BBSRC NIBB Business Interaction Vouchers awarded between July 2015 and March 2016

| Network | BIV title | Primary Investigator | Institution and company |
|-----------|--|----------------------|---|
| ADNet | Anaerobic digestion of vegetable waste from the food industry | Davide Dionisi | University of Aberdeen / William Jackson Food Group |
| ADNet | Process optimisation of Africa's first commercial grid connected AD plant | Charles Banks | University of Southampton / Tropical Power |
| Biocatnet | Biocatalytic synthesis of a diketone | Gary Black | Northumbria University / Robinson Brothers Ltd |
| Biocatnet | Review and Ranking of Biocatalytic Routes for the Sustainable Production of a Number of Organic Compounds | Michael Turner | University of Manchester / AkzoNobel |
| Biocatnet | Review on proprietary and non-proprietary protein engineering techniques (from an industrial point of view) | Nicholas Turner | University of Manchester / Biocatalysts Ltd |
| BioProNET | design consultation and testing of a membrane photobioreactor suitable for advanced biologic production from microalgae | Mike Allen | Plymouth Marine Laboratory / Varicon Aqua Solutions |
| BioProNET | Industry Biotechnology for the production of Hyaluronic Acid from <i>Streptococcus equi</i> – Understanding HA expression | Gerry Blakely | University of Edinburgh / Hyaltech |
| BioProNET | Collaboration on a bio-process to optimize the yields and to characterize and test unique Exopolysaccharides (EPS) from 2 microalgal strains | Kevin Flynn | Swansea University / AlgaeCytes |
| BioProNET | Exploring the feasibility of nonlinear acoustic detection technique for online bioprocess monitoring. | Sourav Ghosh | Loughborough University / CPI |
| BioProNET | Monitoring of host cell proteome expression during bioprocessing of CHO cells expressing recombinant proteins | Martin Michaelis | University of Kent / Total Lab |

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| BioProNET | Supercritical fluid (SCF) processing to improve the stability and delivery of low dose biopharmaceuticals | Helen Philippou | University of Leeds / Crystec |
| BioProNET | A collaboration to engineer a novel protein nanopore for single molecule DNA sequencing applications | Michael Plevin | University of York / Oxford Nanopore technologies |
| BioProNET | Developing a novel fluorescence-based biopharmaceutical quality control technology | Christopher Pudney | University of Bath / Bath ASU |
| BioProNET | enhancing cell growth to allow selection of biopharmaceutical-producer cell lines with favourable properties | Lisa Swanton | University of Manchester / SAL Scientific |
| BioProNET | Predictive tools for folding-supportive sequence design | Tobias von der Haar | University of Kent / UCB celltech |
| C1Net | Cloning and metal analysis of recombinant aldehyde ferredoxin oxidoreductase (AOR) | Martin Warren | University of Kent / ZuvaSyntha |
| CBMNet | Solid state NMR analysis of lipid/surfactant interactions | Bonev Boyan | University of Nottingham / Croda |
| CBMNet | Evaluation of recombinant enzyme production extra-cellularly by <i>Bacillus subtilis</i> | Jeffrey Errington | Newcastle University / Biocatalysis |
| CBMNet | In vitro and in silico models of n-butanol-membrane interactions | Alan Goddard | University of Lincoln / Green Biologics Ltd |
| CBMNet | Acoustical modifications to increase recombinant glycoprotein expression from engineered <i>E. coli</i> cells | Jagroop Pandhal | University of Sheffield / Celbius Ltd |
| CBMNet | Engineering <i>E. coli</i> for enhanced production of antibody fragments | Mark Shepherd | University of Kent / Fujifilm |
| CBMNet | Optimising the disulphide load in the periplasm of <i>E. coli</i> cell factories | Mark Shepherd | University of Kent / Fujifilm |
| CBMNet | Resistance of microorganisms to toxic chemical bio-products | Gill Stephens | University of Nottingham / Green Biologics Ltd, Croda, IBiolC, Algaecytes, Ingenza, Lucite, CPI, Johnson Matthey |
| CBMNet | Flow cytometry assay development for industrial biotechnology plastic production | Martin Waterfall | University of Edinburgh / Ingenza |
| FoodWasteNet | Assessment of the viability of production of flavour products from waste allium process streams using supercritical fluid extraction methods | Ray Mariott | Bangor University / William Jackson Food Group |
| HVCfP | Bio-derived compounds from levoglucosenone - 3 steps from sawdust to solvents | James Clark | University of York / Circa Sustainable Chemicals Ltd |

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| HVCfP | Novel tomato compounds with anti-ageing effects in a human skin bioassay using MALDI-IMS | Jelena Gavrilovic | University of East Anglia / Persephone Bio |
| HVCfP | Natural UV-absorbing compounds from Living stones – evaluation of bioactivity and commercialisation for the cosmetic market | Alison Gail Smith | University of Cambridge / Alkion Biopharma SAS |
| IBCarb | Production of α 2-3 sialylated glyco-standards using a parasite-derived trans-sialidase for use in biopharmaceutical and glycomics analyses. | Sarah Allman | Open University / Ludger Ltd |
| IBCarb | Measuring the effects of cold temperature storage on Monoclonal antibodies (mAbs) | Perdita Barran | University of Manchester / Bioshape Ltd |
| IBCarb | Underpinning synthetic glycobiology with in silico models of UDP-glycosyltransferases | Richard Bryce | University of Manchester / Cyprotex |
| IBCarb | Enhancing extracellular polysaccharide (EPS) production using low-frequency acoustic vibration | Mark Francis Murphy | Liverpool John Moores University / Croda |
| IBCarb | Verification of high throughput glycome screening of saliva in a healthy human cohort | Graham Stafford | University of Sheffield Ludger Ltd |
| LBNet | Investigation of a route to bio-based polymers using an ionic liquid | Jason Hallett | Imperial College, London / Biome Technologies |
| LBNet | Investigating the potential for integrating large scale biofuel and bioenergy production | Simon McQueen-Mason | University of York / Drax Group plc |
| Metals in Biology | Analysis of ferritin iron in pea flour | Janneke Balk | John Innes Centre / Agritopics Ltd |
| Metals in Biology | Studies into the Uptake and Distribution of Metal Oxide Nanoparticles in Plants | Neil Bricklebank | Sheffield Hallam University / Croda |
| Metals in Biology | Investigating platinum group metals in wastes from roadside verges | Neil Bruce | University of York / Yorwaste Ltd |
| Metals in Biology | Investigating uptake and catalytic potential of miscanthus grown on palladium mine wastes | Neil Bruce | University of York / AgriKinetics Ltd |
| Metals in Biology | Microbial recovery of metals from contaminated Miscanthus used in the industrial remediation of degraded landscapes | Chris Chuck | University of Bath / Terravesta Ltd |
| Metals in Biology | Novel disposable cell culture systems for microbial growth in metal- regulated environments | Robert Poole | University of Sheffield / Kirkstall Ltd |
| Metals in Biology | Extracting mercury from industrial waste using microalgae | Mark van der Giezen | University of Exeter / Reym |
| Metals in Biology | Cloning and metal analysis of recombinant aldehyde ferredoxin | Martin Warren | University of Kent / ZuvaSyntha Ltd |

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| Metals in Biology | Maximising Biomarker Detection Sensitivity through Metal Enhanced Fluorescence | Lu Shin Wong | University of Manchester / Aeirtec Ltd |
| P2P | Development of fermentation control mechanisms for thermophilic bacteria | Mark Paget | University of Sussex / Rebio Technologies Ltd |
| P2P | High Throughput Screening Platform for Anaerobes | Klaus Winzer | University of Nottingham / CHAIN Biotech Ltd |
| PHYCONET | Phytography: Digital High Value Products From Phytoplankton | Mike Allen | Plymouth Marine Laboratory / Photoquest Ltd |
| PHYCONET | Characterisation of the potential of <i>Chlorella microalgae</i> to produce recombinant proteins under fermentative growth conditions | Jared Cartwright | University of York / Phycosera Ltd |
| PHYCONET | Cultivation of <i>Dunaliella salina</i> , an extremophile, for glycerol and carotenoids using a novel Single-Use Bioreactor | Patricia Harvey | University of Greenwich / Cellexus Ltd |
| PHYCONET | High throughput screening platform for evaluating desirable phenotypes in microalgae | Brenda Parker | University College London / Algafy Ltd |