



Networks in Industrial Biotechnology & Bioenergy (BBSRC NIBB)

Activities update, September 2015



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.

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 to build international links.

These multidisciplinary networks will drive 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 and are open to new members.

Up to the end of June 2015, the BBSRC NIBB collectively represent approximately **1750 UK based academic members** and have engaged with **428 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 on a quarterly basis 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 – September-December 2015

- 15-16 September – Early Career Researcher event, Nottingham – BioProNET
- 17-18 September – Engineering the membrane for improved cell factories, Sheffield – CBMNet
- 28-29 September – Sandpit, Manchester – Biocatnet
- 28 September - 2 October – Metabolic modelling workshop, Oxford – C1Net
- 22-23 October – Annual meeting, Manchester – BioProNET
- 22 October – Annual meeting, Kew Gardens , London – HVCfP

- 2 November – Characterising and utilising *Rhodococcus* scoping workshop, York – Metals in Biology
- 3 November – Adding value to food processing waste & by-products workshop, Aston University, Birmingham – FoodWasteNet. Registration closing date **2 October 2015**
- 4-5 November – Sandpit event, location tbc – LBNet
- 4-5 November – Glycoanalysis workshop, Manchester – IBCarb
- 9-10 November – Industrial applications of metal-microbe interactions focussed meeting, London – Metals in Biology/Society for General Microbiology
- 10-11 November – Showcase, Manchester – P2P
- 12-13 November – Metal circuits, synthetic biology & C1 gas scoping workshop, Canterbury – Metals in Biology/C1net
- 26-27 November – Metal-related antimicrobials showcase and scoping workshop, Durham – Metals in Biology
- 30 November - 1 December – joint event, Birmingham – Biocatnet/NPRONET

BBSRC NIBB funding dates

Upcoming closing dates for Network funding calls

- Metals in Biology BIVs round 7 closing date 30 September 2015
- FoodWasteNet BIV – 5 November 2015 (tbc), PoC – 8 January 2016 (tbc)
- BioProNET BIV call closes 2 November; PoC call opens 1 October, closes 13 November; Early Career scientific exchange funding closes 2 November
- IBCarb BIV applications to be submitted by 14th to be evaluated that month; Summer studentship scheme opens November 2015

Details of Proof of Concept projects awarded by the BBSRC NIBB since January 2014 can be found in **Annex 1**.

Proof of concept projects awarded by the Networks 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 since January 2014 can be found in **Annex 2**.

Business Interaction Vouchers are a maximum of 6 months in duration, £5k 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 January 2014 to July 2015

Network	PoC title	Primary Investigator	Institution
ADNet	Shotgun metabolomics in anaerobic digestion	James Chong	The University of York
ADNet	Effective mass transfer of hydrogen into digester mixed liquor for biomethanisation of biogas CO ₂	Charles Banks	University of Southampton
ADNet	Development of anaerobic biomass support particles for effective membrane cleaning	Sonia Heaven	University of Southampton
ADNet	Production and extraction of C ₃ and C ₄ aliphatic carboxylic acids from the anaerobic digestion of waste blood as a model substrate	Yue, Zhang	University of Southampton
ADNet	Redesigning hydrolysis reactors for the development of high power density advanced anaerobic digestion enabling containerised electricity production from agricultural residues.	Ian Thompson	University of Oxford
ADNet	Recovery and purification fatty acids and nutrients from anaerobic digester fluids using integrated membrane freeze-thaw (MFT) processes	Robert Lovitt	Swansea University
ADNet	Microbial Enhancement of Phyto Active Compound in Digestate	Richard Dinsdale	The University of South Wales
Biocatnet	High throughput construction and evaluation of multi-enzyme complex cascades in biocatalysis	Geoff Baldwin	Imperial College London
Biocatnet	ENZOFF - Novel enzymes for the greener manipulation of carbamate groups	Nicholas Turner	The University of Manchester
Biocatnet	A targeted 'omics' approach for mining microbial genomes for new lignin transforming biocatalysts	Neil Bruce	The University of York
Biocatnet	Exploring enantiopure amino acid production using immobilized enzyme-couple system	Dominic Campopiano	University of Edinburgh
Biocatnet	Simplified Biocatalyst Production via Auto-Secretion	Neil Dixon	The University of Manchester
Biocatnet	Establishing the rate effects on oxidative bio-transformations by using flow processing	Nikil Kapur	University of Leeds
BioProNET	Towards a cell free expression system based on Pichia Pastoris	Karen Polizzi	Imperial College London
BioProNET	a suite of web tools to predict protein solubility for the biopharmaceutical and biotechnology sectors	Jim Warwicker	The University of Manchester
BioProNET	gene expression accuracy as a parameter in bioprocessing applications	Tobias von der Haar	University of Kent
C1Net	Metabolic modelling to support synthetic biology in C1Net organisms	Andrzej Kierzek	University of Surrey
C1Net	A proteomic approach to optimizing gas fermentation in industrially relevant acetogens	Phillip Wright	University of Sheffield
C1Net	Industrially-driven discovery of C1-utilising microorganisms	Ying Zhang	The University of Nottingham
CBMNet	Using E.coli turgor pressure regulation to optimize product excretion	Teuta Pilizota	University of Edinburgh

CBMNet	Effect of oxygen availability on export of citramalate by Escherichia coli	Gill Stephens	The University of Nottingham
CBMNet	A novel screen for product molecule compatibility with the production cell that accounts for intracellular toxicity.	Jagroop Pandhal	University of Sheffield
CBMNet	Towards an integrated multi-omic assessment of membrane responses during industrially relevant high level protein production and secretion	Graham Stafford	University of Sheffield
CBMNet	Identification of malodour precursor transporter inhibitors using chemical & structural biology	Gavin Thomas	The University of York
CBMNet	Using E.coli turgor pressure regulation to optimize product excretion and prevent unwanted cytoplasmic leakage	Teuta Pilizota	University of Edinburgh
CBMNet	Enhancing industrial succinate production in Corynebacterium glutamicum	Arnaud Javelle	University of Strathclyde
CBMNet	Development of a novel technique to characterise membrane transport and its application to metal transport	Lars Jeuken	University of Leeds
CBMNet	Optimal expression attenuation of membrane transporter proteins	Neil Dixon	The University of Manchester
CBMNet	The function of the aromatic acid transporter VanK	Paul Curnow	University of Bristol
CBMNet	Characterisation of membrane transport by a novel family of efflux proteins	Peter Henderson	University of Leeds
CBMNet	Designing a new coat for E. coli	Shelia MacIntyre	University of Reading
FoodWasteNet	Valorisation of rape seed oil meal	Peter Williams	Glyndwr University
FoodWasteNet	Valorisation of bakery waste via platform chemical production: A feasibility study	Karen Wilson	Aston University
FoodWasteNet	Physical Fractionation of Green Waste- Innovative recovery of nutrient-rich food/food supplement ingredients as an initial stage in a broader biorefinery process	David Gray	University of Nottingham
HVCfP	UNCOVERING REGULATORS OF PACLITAXEL BIOSYNTHESIS	Gary Loake	University of Edinburgh
HVCfP	TARGETING THE MOST CLINICALLY BIOACTIVE OAT AVENANTHRAMIDES.	Luis Mur	Aberystwyth University
HVCfP	LOW COST EXTRACTION OF GALANTHAMINE FROM DAFFODILS	Michael Hale	Bangor University
HVCfP	NEW DRUGS FROM OLD: A PHYTOCHEMICAL GENETICS AND PHARMACOLOGICAL SCREEN OF SALIX	Mike Beale	Rothamsted Research
HVCfP	Screening for antiparasitic leads from a novel and diverse library of natural products from temperate zone plants	Paul Horrocks	Keele University
HVCfP	Development of natural sweeteners from Stevia rebaudiana	Ian Graham	The University of York
HVCfP	A Synthetic Metabolon for the production of high value carotenoid pigments	Paul Fraser	Royal Holloway University
IBCarb	Development of a CO ₂ based fractionation platform for sugars and its application in the Isolation of sugar alcohols from by-product streams for use as a sucrose replacement in confectionery	Ray Marriott	Bangor University
IBCarb	Generation of oligosaccharides from a branched marine glycosaminoglycan – fucosylated chondroitin sulfate	Dusan Uhrin	University of Edinburgh

IBCarb	Synthesis of divergent mimetic H/HS-like core	John Gardiner	The University of Manchester
IBCarb	Chemoenzymatic production of high value heparin-based compounds for biotechnology applications.	Jerry Turnbull	University of Liverpool
IBCarb	Development of multi-step enzymatic routes for the synthesis of sialic acid derivatives	Nathalie Juge	Institute of Food Research
IBCarb	Glycan receptor decoys for the management of the gut microbiome: a focus on valorisation of sugar beet polysaccharides	Rob Field	John Innes Centre
IBCarb	Automated Synthesis of Beta-1,3-Glucans for Targeting Antigen Processing	Martin Fascione	The University of York
LBNNet	Maximizing the Real Value of Lignin (MaRVeL)	Tim Bugg	University of Warwick
LBNNet	Arabinoxylan co--production from sugarcane bagasse in integrated biorefineries (ACSIB)	Grant Campbell	The University of Huddersfield
LBNNet	Integrated catalytic processing of lignin	Gill Stephens	The University of Nottingham
Metals in Biology	Enhancing E. coli for optimal cofactor insertion into heme and iron-sulfur cluster proteins	Nick Le Brun	University of East Anglia
Metals in Biology	Mag-Tag: magnetite nanoparticle affinity tags for industrial biotechnology protein purification.	Sarah Staniland	University of Sheffield
Metals in Biology	Proline Hydroxylases for Biocatalysis	Chris Schofield	University of Oxford
Metals in Biology	Light-activated caged-iron chelator for skin photoprotection based on the natural product pulcherrimic acid	Charareh Pourzand	University of Bath
Metals in Biology	New routes for expression of heme protein targets	Emma Raven	University of Leicester
Metals in Biology	Tailoring the in planta synthesis of metal nanoparticles for production of high-value catalysts.	Neil Bruce	The University of York
NPRONET	Developing a pipeline for antibiotic discovery	Matt Hutchings	University of East Anglia
NPRONET	Production, upscaling and analysis of (mixtures of) novel natural products using a biomimetic culturing approach	Geertje Van Keulen	Swansea University
NPRONET	Novel hybrid PKS-NRPS clusters to modulate the activity of the Isoleucyl tRNA synthase inhibitor mupirocin	Christopher Thomas	University of Birmingham
P2P	QWV - waste stream valorisation	Joe Gallagher	University of Aberystwyth
P2P	Narcissus Liquefaction and Extraction (NarLEx)	Ana Winters	University of Aberystwyth
P2P	Bioconversion to short chain esters for reactive extraction and fermentation product upgrading	David Leak	University of Bath
P2P	Ozonolysis of lignocellulosic biomass using low energy microplasma reactors	Hemaka Bandulasena	Loughborough University

P2P	Pilot scale production of lipid from the oleaginous yeast <i>M. pulcherrima</i> cultured on waste rapeseed meal	Christopher Chuck	University of Bath
P2P	Biorefinery Advisory Model (BAM)	Tony Bridgwater	Aston University
PHYCONET	ALGEBRA: ALGal Environmental and Biotechnological Risk Assessment	Mike Allen	Plymouth Marine Laboratory
PHYCONET	Development of an algal crop protection program through vaccination by novel viruses	Willie Wilson	Plymouth Marine Laboratory
PHYCONET	Exploring chlorophyll-f and associated metabolism for improved intensive cultivation of cyanobacteria	Carole Llewellyn	Swansea University
PHYCONET	Unlocking the potential of <i>Dunaliella</i> through development of transformation-based strategies for gene manipulation	Thomas Bibby	University of Southampton
PHYCONET	Exploiting the genetic potential of <i>Galdieria sulphuraria</i> for Industrial Biotechnology	Seth Davis	The University of York

Annex 2: BBSRC NIBB Business Interaction Vouchers awarded January 2014 to July 2015

Network	BIV title	Primary Investigator	Institution and company
ADNet	Testing of anaerobic digester components under conditions found in thermophilic digestion of food wastes	Sonia Heaven	Southampton University Permastore
ADNet	A modelling tool for the UK AD industry	Sonia Heaven	Southampton University IEA Task 37 (UK)
ADNet	Providing a scientific evidence base for public subsidy support of biomethane for transport from waste	David Styles	Bangor University Evergreen Gas Ltd
ADNet	Evaluating cost-effective greenhouse gas abatement by small-scale anaerobic digestion	David Styles	Bangor University Renewable Energy Association
Biocatnet	Structure-Guided Evolution of an industrial esterase from <i>Bacillus</i> sp. (1.5.2-Biocatalyst Development and Optimisation).	Gideon Grogan	University of York Dr Reddy's Laboratories
Biocatnet	Genome Mining for Bacterial Aldehyde Oxidases	Andrew Carnell	University of Liverpool Prozomix Ltd
BioProNET	evaluating enhancement of secretion for recombinant proteins in CHO cells via overexpression of 7SL RNA	Bob White	University of York Cobra Biologics

BioProNET	initial development of novel product concepts with unique pharmacokinetic characteristics	Randall Mrsny	University of Bath Arecor
BioProNET	A pilot study to improve the expression of a Clostridium difficile toxin-based fragment in E.coli	Tarit Mukhopadhyay	University College London Public Health England
BioProNET	Evaluating the use of Raman Spectroscopy to determine topological isoforms of plasmid DNA	Lorna Ashton	University of Lancaster Cobra biologics
BioProNET	Rapid Processing to Recover High Value Microbial By-products	Paul Clegg	University of Edinburgh Recyclatech
BioProNET	Production of therapeutic and industrial proteins in microalgae	Anil Day	University of Manchester Protein technologies
BioProNET	Exploiting advanced electron microscopy to optimise protein and biologic expression platforms	Corrine Smith	University of Warwick Jeol UK
BioProNET	Development of a crossflow filtration dynamic flux control system to reduce cell harvest time	Yuhong Zhou	University College London BioPro Control Tech
CBMNet	Evolution of butanol resistance in Escherichia coli	Gavin Thomas	University of York Green Biologics
CBMNet	n-Butanol Interactions with Biological Membranes	Alan Goddard	University of Lincoln Green Biologics
CBMNet	Transporter systems for fatty acids in a glycolipid-producing yeast	Douglas Kell	University of Manchester Croda Europe
FoodWasteNet	Sonication Enhanced Recovery of Anthocyanins from Blackcurrant Waste (SERAB)	Ana Winters	Aberystwyth University Celbius Ltd;A&R House (BLC) Ltd
FoodWasteNet	Investigating the potential of rapeseed meal for producing high value food ingredients and additives	Carol Wagstaff	University of Reading Stainswick Farm Oil
FoodWasteNet	Recovery of food waste from MSW during pulping	Sonia Heaven	University of Southampton Fiberight Ltd
FoodWasteNet	High value chemicals from beetroot waste for fast moving consumer goods	Avtar Matharu	University of York Unilever R&D Port Sunlight
FoodWasteNet	Process Improvement Feasibility Study	Keith Waldron	IFR CelluComp
FoodWasteNet	Safe and efficient movement of bulk material in bio-bean ltd's Alconbury Processing Facility	Michael Bradley	University of Greenwich Bio-bean ltd

FoodWasteNet	Conversion of waste bread from sandwich industries to bioethanol by thermophilic bacteria capable of utilizing oligomeric sugars.	David Leak	University of Bath Greencore Prepared Foods
FoodWasteNet	Extraction of polyphenolic compounds from blackcurrant skins	Paula Jauregi	University of Reading A&R House (BCL) Ltd
HVCfP	Assessment and optimization of microwave assisted extraction of galanthamine and other alkaloids from daffodils for the UK pharmaceutical industry	Xianmin Chang	Royal Agricultural University Agroceutical Products Ltd
HVCfP	Road map for the use of Sargassum muticum in high value bioactive compound discovery	Birthe Nielsen	University of Greenwich IOTA Pharmaceuticals Ltd
HVCfP	Discovery of Novel Plant-Derived Agrochemicals	Ray Marriott	Bangor University Crop Intellect Ltd
HVCfP	Identifying high value bioactive complex carbohydrates/polysaccharides from a high exopolysaccharide (EPS) forming strain of microalgae	Paul Knox	University of Leeds Algaecytes Ltd
HVCfP	PinS - Pinitol Isolation from Senna Seeds	Ana Winters	Aberystwyth University Phytovation Ltd
HVCfP	PylEx – Pyrethrum liquid extraction (liquid-liquid fractionation of components of a naturally occurring insecticide)	Ana Winters	Aberystwyth University Agropharm Ltd
HVCfP	Characterisation of the bioactives from Mugwort roots active against the oomycete pathogen of carrot and parsnips, Pithium spp.	Cathie Martin	John Innes Centre Root Crop Consultancy Ltd.
HVCfP	Purification of High Value Molecules using Vibrational Membrane filtration	Ray Marriott	Bangor University Blue Sky Botanics Ltd
HVCfP	Extraction of a novel chelate from native UK plant species	Vesna Najdonovic	Lancaster University Levity CropScience Ltd
HVCfP	Establishing genome resources for improving the production of high value chemicals from simple plant systems	Anil Day	University of Manchester AlgaeCytes Ltd
HVCfP	Screening microalgae species for waste water phosphate removal/recovery and high value chemicals production	Chris Ennis	University of Teeside TeeGene Biotech Ltd
IBCarb	Verification of high throughput glycome screening of saliva in a healthy human cohort	Graham Stafford	University of Sheffield Ludger Ltd,

IBCarb	Development and validation selective colorimetric probe for selective discrimination of industrially relevant monosaccharide and disaccharide substrates.	Matthew Gibson	University of Warwick Ingenza
IBCarb	Exploring the generation of single glycoprotein glycoforms	Daniel Ungar	University of York Dextra Laboratories
IBCarb	Bioprocessing of Bacterial Exopolysaccharide	Ray Marriott	Bangor University Croda Europe Ltd
IBCarb	Analysis of polysaccharide fragments using mass spectrometry	Sabine Flitsch	University of Manchester GlycoMar Ltd
IBCarb	Towards the Synthesis of a Fucosylated Chondroitin Sulfate Library	Martina Lahmann	Bangor University GlycoMar Ltd
IBCarb	Building blocks for designer alginates	Gavin Miller	University of Manchester GlycoMar Ltd
IBCarb	Isolation and Characterisation of Industrially Relevant Microbial-polysaccharides	Andrew Laws	University of Huddersfield Croda
LBNet	Testing the effect of polyethylene glycol as an enzyme enhancer in lignocellulosic hydrolysis	Charles Banks	University of Southampton Fiberight Ltd
LBNet	Structural characterisation of novel GH9 family enzymes from marine polychaetes	John McGeehan	University of Portsmouth Novozymes A/S
LBNet	Valorising poppy straw waste streams	Simon McQueen-Mason	University of York Johnson Matthey Technology Centre
LBNet	Testing bacterial lignin degrading enzymes for delignification of municipal solid waste	Tim Bugg	University of Warwick Fiberight Ltd.
LBNet	An innovative way to delivery Ca and Cu to plants safely using lignin	David Stainton	University of Lincoln Crop Intellect Ltd.
LBNet	Sonochemical pretreatment of biomass	Leonardo Gomez	University of York SERE-Tech Innovation Ltd
LBNet	Softwood Waste as a Source of Renewable Platform Chemicals	Leonardo Gomez	University of York Advanced Extraction Technology Ltd
Metals in Biology	Metal demands during protein overexpression in bacteria	Peter Chivers	Durham University Biocatalysts Ltd

Metals in Biology	Optimising metal acquisition by commercial metalloenzymes	Kevin Waldron	Newcastle University Biocatalysts Ltd
Metals in Biology	Optimisation of heme incorporation into a commercially important enzyme	Nick Le Brun	University of East Anglia Biocatalysts Ltd
Metals in Biology	Metalloenzyme system for Hydrogen-driven NADPH recycling in pharmaceutical synthesis	Kylie Vincent	University of Oxford GSK
Metals in Biology	Quantitative understanding of metal binding specificity in cells	Buddho Chakrabarti	Durham University Procter and Gamble
Metals in Biology	Developing an ultra-compact integrated hyperspectral monolithic fluorescence biosensing system	Po-Wah So	King's College London Zinir Ltd
Metals in Biology	Metallo-enzymes for the production of nootkatol, a potential new citrus flavour	Luet Wong	University of Oxford Oxford Biotrans Ltd
Metals in Biology	Adding Value to Galactomannan Polysaccharides with Cu-Enzymes	Julea Butt	University of East Anglia Schlumberger Gould Research
Metals in Biology	Chelation Therapy in the Washing Machine	Nicholas Jakubovics	University of Newcastle Procter and Gamble
Metals in Biology	Assessing the bioavailability of metal ions accumulated by DRAM® filters	Louise Horsfall	University of Edinburgh Epona Technologies Ltd
Metals in Biology	Development of new refolding methodologies for expression of heme protein targets	Emma Raven	University of Leicester Roche Innovation Centre
Metals in Biology	Metal interactions with a novel disulphide folding catalyst: a new strategy to improve antibody fragment production	Mark Shepherd	University of Kent UCB
NPRONET	Development of understanding of the genetic elements for biosurfactant production by a basidiomycete yeast	Mark Caddick	The University of Liverpool Croda Europe Ltd
P2P	Improved interaction & new research technology transfer	Christopher Chuck	University of Bath Croda
P2P	Continuous pulping of plant-derived waste lignocellulosic biomass	Charles Banks	University of Southampton Fiberight
P2P	Joint research project between an HEI (Aberystwyth University) and an industrial SME (Marine Biopolymers Ltd)	Jessica Adams	Aberystwyth University Marine Biopolymers Ltd

P2P	Investigation of Viridor waste management processes to identify plant-based waste streams that can be utilised as feedstocks for industrial biotechnology.	Trisha Toop	Harper Adams University Viridor
P2P	Fast pyrolysis processing of Miscanthus x giganteus used in phytoremediation for production of fuels and chemicals	Tony Bridgwater	Aston University Terravesta Ltd
P2P	Biorefinery process improvement	Ana Winters	Aberystwyth University Pennotec
P2P	Assessing the use of cost effective ionic liquids in the processing of municipal solid waste (MSW)	Jason Hallett	Imperial College London Fiberight
P2P	Characterisation of polysaccharides derived from seaweeds, along with a preliminary assessment of their potential for development as nutraceutical, healthcare and functional food and beverage products	Edwin Yates	University of Liverpool Seaweed Alchemy Ltd
P2P	Technology transfer activities/ sharing of information and expertise to address specific technical challenges	John Irvine	University of St Andrews Green Fuels Research
P2P	Evaluation of potential biochemical production from lignocellulosic raw material using thermophilic microorganisms	Chenyu Du	University of Huddersfield Biotech Consultants Ltd
PHYCONET	Research Grade Algae – a supply bottleneck in algal research and development	Matt Davey	University of Cambridge Pursuit Marine Drive Limited
PHYCONET	Post lipid extracted microalgal biomass as a substrate nutrient supplement for mushroom cultivation	Ralph Noble	East Malling Research AlgaeCytes Ltd