

Testimonials

Testimonials from Industry

“The BIV provided a quick, convenient and effective route for us to bring together the Manchester group’s expertise in bio-production of metal particles with Johnson Matthey’s catalysis know-how. We have begun to determine the potential of this technology for the production of novel catalysts and look forward to ongoing fruitful collaboration as the work develops further.”

Nigel Powell, Johnson Matthey

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Nigel Powell, Johnson Matthey

“An ongoing collaboration, funded outside of the BBSRC NIBB between P&G and Professor Robinson on cell metal regulation in Salmonella, aims to build a fundamental understanding of how microbes detect metals to guide the design of novel antimicrobial treatments.”

Dr Elena Lurie-Luke, P&G

“The BIV has allowed P&G to establish a good relationship with academic experts in applied biofilm research and imaging, which we hope to take forward via future collaborations.”

P&G

“The learnings stemming from the BBSRC NIBB have helped to elucidate the importance of metal management for product development and formulation. We are applying these learnings to both current products and new product initiatives that will provide enhanced consumer experience.”

P&G

“For Biocatalysts Ltd, this study highlighted the importance of metal supplementation in commercial fermentation processes to maximize enzyme activity and yield.”

Mark Blight, Biocatalysts Ltd

“Your work provides us with a very useful number; the percentage of heme incorporated in the P450. In our customer project they ask us to measure total heme in homogenised fermenter biomass with a CO assay. This, of course hides the protein:heme ratio and the final number needs to be between about 10-20 μM . Again, if we make a lot of protein then this helps this to increase. Equally, if we get good heme incorporation then this value will also rise. So, 2 factors determine the product specification in terms of heme content; the protein yield and the % heme loading. We had no measure of the heme loading to date and so did not know if there was room for improvement. Your data suggests that there is. Thanks, this is a rewarding outcome of the BiV for Biocatalysts.”

Biocatalysts Ltd

“This work showed that the P450 enzyme was sub-optimally loaded with heme. Further enhancement of heme incorporation could increase the commercial yields of this enzyme, so we support further investigations into this and are pleased to continue our collaboration with Professor Le Brun’s laboratory.”

Biocatalysts Ltd

“The project worked a lot better than even we expected. This BIV research program contributed to the scale-up of nootkatone (grapefruit flavour) synthesis leading to commercial launches in Europe and Asia”.

Oxford Biotrans Ltd

“We were pleased to see such encouraging results from the project, both in terms of the whole-cell bioconversions and the subsequent derivatisation of the metabolites.”

Jason King, Oxford Biotrans

“The collaboration generated many ideas for further development of the proposed system and also for other photonics-based solutions to problems in biomolecular imaging. We are therefore discussing a variety of future projects and exploring funding for a longer and more in-depth collaboration. Dr Joanna Coote, who worked on this project for ZiNIR said “This has been a fascinating project where we have learned a great deal about fluorescence imaging techniques, both in biomedical science and in industrial biotechnology. We have generated a great many ideas for further development of the proposed system using ZiNIR’s spectrometer chips, and also for other photonics-based solutions to problems in biomedical and molecular imaging, and I look forward to a further collaboration with Po-Wah on a longer and more in-depth project.”

ZiNIR Ltd

“Our BIV is helping to understand the fundamentals of recombinant protein expression in E. coli.”

UCB-New Medicines

“The BBSRC NIBB has helped us to build a substantial collaboration with Chris Schofield and co-workers with respect to the late stage functionalisation of drug like molecules by enzyme and non-enzyme catalysed methods.”

UCB-Celltech

“Through the BIV, the network has allowed us to better evaluate the readiness level of Louise Horsfall’s developing technology. This project assessed the potential to recover copper(II) from DRAM® media filters and its bioconversion to metallic nanoparticles harnessing the ability of M. psychrotolerans to reduce Cu(II) to Cu(0). Approximately 12% of Cu(II) ions are reduced by M. psychrotolerans to metallic Cu(0) nanoparticles after overnight incubation in LB medium containing 5 mM CuSO₄. It is expected that the gradual release of copper from the DRAM® media may alleviate copper toxicity to live cells and thereby increase productivity. It may be possible to scale up for commercial metal recovery.”

Epona Technologies Ltd

“We are very pleased that this BBSRC NIBB-funded Business Interaction Voucher has made it possible for us to establish contact with the University of York and support their research towards the development of additional uses for UK-grown Miscanthus.”

Mike Cooper, Miscanthus Nursery Ltd

“Without the BBSRC Metals in Biology grant we would have found it much more difficult to collaborate with the University of Southampton on investigations in to anti-microbial copper nanoparticles.”

Copper Clothing Ltd

“Production of enzymes in quality and quantity sufficient for biophysical and structural analysis has consistently been a major bottleneck for drug discovery efforts. This scheme is hugely welcomed, to help overcome these bottlenecks, not just for my company but for the entire pharmaceutical sector.”

Andreas Kuglstatter, Roche Innovation Centre

“The results from this collaboration have enabled us to develop techniques and gain experience which will help towards the development of alternative plant-based remediation practices for sweeper wastes.”

Yorwaste Ltd

“The learnings stemming from the BBSRC NIBB have helped to elucidate the importance of metal management for product development and formulation. We are applying these learnings to both current products and new product initiatives that will provide enhanced experience. We are very pleased that this BBSRC NIBB-funded Business Interaction Voucher has made it possible for us to establish contact with the University of York and support their research.”

Hans de Bie, WeissBioTech GmbH

“We are pleased to be part of this research project as we believe that LPMO’s will play a significant role in the future in starch hydrolysis and starch modification. Not only will LPMO’s help with making current processes more efficient but they will also assist in the development of new starch derived products. So far the development of the LPMO’s has progressed very swiftly and we are excited to see the next steps in this project as it has a great potential. We fully support the work and methods employed by the team. We highly appreciate this work and progress.”

Hans de Bie, WeissBioTech GmbH

“Collaboration through the metals in biology NIBB has opened up an area of research we had not previously considered. Preliminary data has given us an insight into the role of particular metal ions throughout the growth of our industrial microbes and has the potential to aid us in further targeted optimisation of our microbes and fermentation process.”

Dr Liz Jenkinson, Green Biologics Ltd

“The BBSRC NIBB has helped us substantially build on our collaboration with Keith Lindsey at Durham University School of Biological & Biomedical Sciences and to further our work on the synthesis of copper nanoparticles from waste water.”

Andrew Moore, Northumbrian Water

“This study has helped us see the potential future use of plants, plant cell culture or specific plant-produced compounds to remove contaminating copper and other trace metals from, for example, waste water in order to synthesize commercially valuable metal nanoparticles.”

Andrew Moore, Northumbrian Water

“The collaboration has allowed us to apply expertise in mass spectrometry to an industrially relevant area in seed enhancement, springboarding further research into the area of nutrient delivery.”

Croda Europe

“Through the input of science and support by John Innes Centre in this project, the speed to commercial establishment of the new start-up business and product development has been considerably accelerated.”

AgriTopics Ltd

“The growth of Escherichia coli in the novel cell culture system in a defined minimal medium is comparable with growth in traditional glass vessels; this opens up a new market opportunity for this system as cell culture chambers for microbiology.”

Kelly Davidge, Kirkstall

“With the expertise of the University of Manchester we have been able to add visible dyes to particles while retaining fluorescent signaling conjugated to the particle surfaces.”

Stephen Kilfeather, Aeirtec Ltd

“The project has demonstrated to us the range of avenues for incorporation of metal-enhanced fluorescence in enhancement of biomarker measuring platform sensitivity.”

Stephen Kilfeather, Aeirtec Ltd

“Through the BIV, the network has allowed us to better evaluate the readiness level of our collaborator’s developing technology. It may be possible to scale up this technology for commercial metal recovery.”

Epona Technologies Ltd

“With this funding, we were able to kick start a new collaboration, bringing technologies together that wouldn’t have been possible from any other funding source.”

Michal Mos, Terrevesta Ltd / Chris Chuck, University of Bath

“The work has been an eye-opener for the company in terms of the potential for optimisation of the plant, and a huge benefit in terms of skills transfer to our staff.”

Michael Mason, Tropical Power Ltd

Testimonials from Academia

“An application submitted to BBSRC (DRINC) resulted from the BBSRC NIBB Metals and Nutrition meeting at Canterbury Cathedral lodge last December. This application would not have proceeded if not for this BBSRC NIBB workshop (where I meet Dora Periera). So, big thanks from me for all your efforts with this BBSRC NIBB! The application got through the pre-application stage and full application is now being considered on The Relationship between Dietary Iron and the Gut Microbiome. Can Dietary Iron Regime be Exploited to Improve Health.”

Simon Andrews, University of Reading

“Our demonstration of H₂-driven NADPH recycling on the BBSRC NIBB project has led to a new collaboration within Oxford with Prof Luet Wong, on H₂ driven NADPH-dependent cytochrome P450 reactions. We are currently preparing this work for publication. The BBSRC NIBB project helped provide proof-of-concept for some of the research that formed the basis of our successful bid for Translation funding under the IB Catalyst, round 3 (EP/N013514/1, £2.9m). It also helped in strengthening our link with project-partner GSK – they agreed to be on the Industrial Advisory Board for our IB Catalyst project, thus greatly supporting our bid. This Translation funding has allowed us to retain Dr Holly Reeve, who worked on the BBSRC NIBB project, as Project Manager, and another postdoc in my group, and so far we have recruited an additional 2 postdocs for the IB Catalyst project, bringing in a network of researchers from different backgrounds.”

Kylie Vincent, University of Oxford

“A Business Interaction Voucher from the Metals in Biology BBSRC NIBB, to test whether we could produce enough NADPH to drive some NADPH-dependent enzymes that GlaxoSmithKline are interested in provided real proof of the versatility of the HydRegen technology.”

Kylie Vincent, University of Oxford

“The BBSRC NIBB has helped in the preparation of a joint proposal with UCB on chemical methods for late stage functionalisation (EOI now with EPSRC). We are planning a BBSRC bid on enzymes for late stage functionalisation.”

Chris Schofield, University of Oxford

“The project has revealed the substrate selectivity of oxygenases is much wider than we had expected, further highlighting their potential in biocatalysts for medicinal chemistry.”

Chris Schofield, University of Oxford

“This BIV has sparked new collaborations to investigate the potential of our disulphide-folding machinery to assemble a range of protein targets of biotechnological importance.”

Mark Shepherd, University of Kent

“NIBB meetings have brought me into contact with a range of industrial contacts. This BIV sparked a new project with DiosynthBiotechnologies to investigate the potential of bacterial copper-tolerance machinery to facilitate assembly of protein targets of biotechnological importance.”

Mark Shepherd, University of Kent

“The PoC has made a very fruitful industrial collaboration possible by means of a very simple and timely funding system. Will launch a whole new industrial research area for us.”

Sarah Staniland, University of Sheffield

“By working with industrialists to address a specific question us academics have gained unique insights from those with first-hand experience of running a commercial process. Particularly valuable has been increased awareness of the complexities and practicalities of working ‘in-the field’ and the range of scientific challenges that are available to be addressed. Typically such insights are difficult to access and in large part this knowledge exchange was facilitated by the inter-disciplinary nature of the team that partnered industry-based chemists and biochemistry-facing academics. This is evidenced in feedback on our research in which the industrialists highlight wider ranging impact than had been identified in the original proposal.”

Julea Butt, University of East Anglia

“The award for this scoping project provided a mechanism for in-depth discussions and a

better understanding of each other's disciplines. Our discussions generated many innovative ideas and identified key resources needed to develop them. We have continued to communicate and discuss possible funding streams."

Po-Wah So, King's College London

"The BBSRC NIBB has brought me into contact with diverse researchers in the industrial sector, people who I would probably have never encountered through other channels. I was able to initiate a small-scale collaborative study with one such industrial contact, to determine whether metal- supply to their protein products was sub-optimal."

Kevin Waldron, Newcastle University

"The BBSRC NIBB has facilitated new academic and industrial collaborations. These collaborations have directly led to grant applications. The BBSRC NIBB has facilitated new academic collaborations in the EU and enabled us to identify new, valuable waste sources."

Neil Bruce, University of York

"Microbialising the metal control of the CHO cell chassis has the potential to yield new mammalian expression techniques with novel methods of delivering trace metals to improve cell growth, product synthesis and product quality."

Professor Mark Smales, University of Kent

"The Metals in Biology Network is developing new functional materials using microbial systems that can tap into waste materials. Here, there are clear synergies between Metals in Biology, other BBSRC NIBB, and related UK and European Union funding initiatives in the environmental sector."

Professor Jonathan Lloyd, University of Manchester

"This BIV allowed us to build links with a world leading industrial partner via a simple funding scheme. The project has led to successful development of novel nanomaterials, an avenue which we are excited to continue to explore. It helped underpin a successful responsive mode grant application with the company as a formal project partner, which is an excellent outcome."

Jon Lloyd and Rick Kimber, University of Manchester

“Humans need vitamin B12 – a cobalt-containing vitamin – in their diet, but plants do not make it. Work, therefore, is underway to enhance the biomanufacture of vitamin B12 by engineering the enhanced incorporation of cobalt.”

Professor Martin Warren, University of Kent

“We showed that a novel compartmentalisation strategy can be used to produce a biotechnologically important enzyme in bacteria. Our results are being used to help acquire further strategic investment in the partner company.”

Professor Martin Warren, University of Kent

“We have identified the first bacterial lignin peroxidase, which has the potential to be used to produce renewable chemicals from lignin.”

Professor Tim Bugg, University of Warwick

“Only now are we beginning to understand the complexities of metallocofactor assembly and insertion. This knowledge will open up an array of metalloenzymes to synthetic biology approaches that can harness the power of these natural catalysts for novel biotransformations.”

Professor Nick Le Brun, University of East Anglia

“Synthetic chemists have developed cell-permeable complexes that exploit the intense and ‘tuneable’ light emission of lanthanides and transition metals. Such probes can be adapted to detect metals in cells. We are designing new emissive molecules that will respond to other metal ions with tuneable affinities and that can be guided to different parts of the cell.”

Professor Gareth Williams, Durham University

“Our project provides a robust basis for the use of molecules inspired by pulcherrimic acid as ligands for the development of novel light-activated photoprotective compounds that could be used in sunscreen.”

Charareh Pourzand, University of Bath

“The on-going collaboration with Novozymes into the chemistry and activities of biomass-degrading enzymes continues to provide very fruitful research, not only in the discovery of the fundamental chemical processes exhibited by these enzymes but also their potential in biomass processing.”

Paul Walton, University of York

“The new form of LPMO enzymes is intriguing as it does not contain the usual amino acids at its active site, suggesting that it could be active on a new range of biomass components.”

Paul Walton, University of York

“A BBSRC Metals in Biology NIBB scoping workshop highlighted advances in the understanding of metal-handling systems of microbes and hosts, with the aim of improving collaboration to tackle antimicrobial resistance.”

Robert Poole, University of Sheffield

“This project laid the foundation for an efficient high-throughput workflow towards understanding and engineering one of nature’s most challenging enzymes biotin synthase. A better and faster approach with much broader scope than ever before will allow us improving the synthesis of the important vitamin B7 more efficiently.”

Christof Jäger, University of Nottingham

“Finding an easier and cheaper way to reclaim of platinum which would otherwise be lost to the environment is important for global resource management.”

Helen Carney, Teesside University

“Increasing the stability of the enzyme catalyst in biocatalytic oxidation technology will improve the catalyst lifetime, leading to improved process productivity and broadening the range of products accessible to this technology platform.”

Luet Wong, University of Oxford

“This collaboration has allowed us to initiate a collaboration with Piramal that will hopefully lead to many other useful interactions.”

Gary Black, Northumbria University