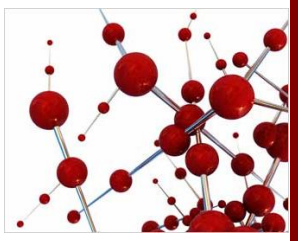
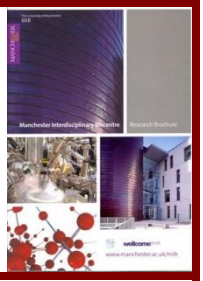


MIB Newsletter

June /July 2011

Research News
Funding News
Congratulations
Seminars
Events / Symposia
Publications

More news and information about the MIB can be found on our website:
http://www.mib.ac.uk/
and in the MIB brochure available online



Research News

New academic in MIB - Robin Curtis

Robin Curtis has now moved his research group into the MIB and can be found on the second floor (2.029). Robin's main research interests are in determining and understanding the molecular origin of weak protein-protein interactions. Most applications of the work are in bioprocessing where we use various approaches (molecular simulations, colloidal theories, statistical mechanics) to link non-specific protein-protein interactions to a broad range of behaviour, including protein solubility, crystallizability, viscosity, and aggregation propensity. Developing these predictive methods leads to improved methods for assessing the manufacturability of therapeutic proteins and will aid in their bioprocess design. As part of this, we are currently developing static light scattering as a rapid method for quantifying the interactions over a broad range of solvent conditions, such as pH, ionic strength, salt type, or the presence of other solution additives. The knowledge gained from these experiments not only allows us to develop predictive interactions models, but is also key to bioprocessing where a broad range of conditions are encountered throughout the upstream to downstream production and formulation stages. We also use a similar approach for studying biologically relevant weak protein-protein interactions, such as those that occur in electron transfer systems. In a project on the P450-BM3 system, we complement measurements and modelling of the BM3 homo-dimerization with steady-state and transient kinetic experiments to provide structural insights into the enzyme function.

Weak protein-protein interactions, in contrast to well-defined protein-protein complexes, are transient in nature and for this reason depend sensitively on solvent conditions. We believe that there are many effects of solvent conditions that are poorly understood. For instance, studies on model homopolyepeptides go against what is expected based on electrostatic arguments, in that increasing ionic strength leads to enhanced repulsive forces between charged protein groups and the behaviour depend sensitively on the type of dissolved ions. The results are used to provide insights into why arginine can be a hot spot for protein-protein interactions and how lysine groups protect against deleterious protein-protein attraction. Contact: Robin Curtis

A Taste for Public Engagement.

Biochemistry undergraduate student **Rachel Perring**, supervised by Dr Steve Prince (MIB) has been involved in a public education program at Eureka, the national children's museum in Halifax. For her final year Education Project she developed a learning curriculum and prototype exhibit on taste reception aimed at primary school children. The project will be used to help the museum team develop their upcoming "Me and My World" exhibition at Eureka, partly funded by the Wellcome Trust. In addition to her poster display, Tim Eyes (MIB PhD student) helped Rachel design a 3D model of a taste receptor molecule for her project, created by rapid prototyping of a PDB model. The model acted as a visual and hands-on tool to describe how taste reception works to her audience. Rachel has since been awarded a 1st class degree and has already secured employment in a multinational food company. Based on the success of the project, the collaboration between the MIB and Eureka will continue and it is hoped that similar schemes will run in the future.

Figure 1. Rachel's Taste reception exhibition at Eureka.


Figure 2. Sweet taste receptor model.

Intellectual Property Awareness Resource

UMIP – the University's intellectual property (IP) commercialisation company would like to make you aware of its IP Awareness Resource, co-developed with Eversheds LLP. The resource is targeted at academics and research staff and its aim is to increase the awareness of IP and demonstrate the benefits of its commercialisation to the University and the IP generator.

You will find a series of video clips by professionals and academic colleagues on various aspects of IP and its commercialisation. We hope that this resource gives you a valuable insight into the types of IP which can be used to protect novel ideas/inventions and how, for example, IP can be commercialised via spin-out or licence with the help of UMIP. Also featured is information on IP and Academic Materials and IP within a Research Contract and Consulting environment with links to various forms, process guides and booklets which you may find useful.

www.manchester.ac.uk/ipresource

Funding News

BBSRC **International Scientific Interchange Scheme (ISIS)**

Application deadline: apply at any time (at least 6 weeks before travel)
Aim: To help scientists add an international dimension to their BBSRC funded research by making and establishing new contacts with international counterparts. For further details please see website

EPSRC Doctoral Prize

The EPSRC Doctoral Prize (formerly PhD Plus) scheme for 2011 has now been launched. Full details are on the website. The full application should be returned by e-mail to mdc@manchester.ac.uk by no later than 12 noon on Monday 15th August.

BBSRC impact fellowships

Proposal deadline: 6 September 2011
Note: This will be the last round in the programme's current form.
This scheme enables highly skilled research and technology leaders to transfer their skills and experience from the industrial sector to **BBSRC-funded centres, institutes or academic departments** with **significant** BBSRC-funded research programmes.
Up to 3 fellowships are available to start by the end of 2012.
Aims of the scheme

- To enhance the impact of BBSRC-funded research
- To encourage collaboration and partnership between academic and industrial sectors

See website for further details.

BBSRC-Brazil (FAPESP) joint funding of research

RCUK-FAPESP memorandum of understanding
Research Councils UK (RCUK) and FAPESP, the State of Säo Paulo Research Foundation, have agreed a Memorandum of Understanding (MoU) to welcome, encourage and support applications that may cut across their national boundaries and involve international collaborative teams. The MoU provides for a 'Lead Agency Agreement' whereby the relevant UK Research Council will receive and assess collaborative proposals from eligible institutions on behalf of both organisations. FAPESP nominated experts will be involved with the peer review and decision making processes throughout. For further information see the RCUK-FAPESP MoU (see website).

Funding Deadlines & Links

NERC http://www.nerc.ac.uk/
EPSRC http://www.epsrc.ac.uk/default.htm
BBRSC http://www.bbsrc.ac.uk/funding/index.html - next deadline 25th October 2011
MRC http://www.mrc.ac.uk/index.htm
Wellcome Trust http://www.wellcome.ac.uk/Funding/Biomedical-science/index.htm
ESRC http://www.esrc.ac.uk/ESRCInfoCentre/index.aspx

Congratulations

TOP

Recent Grant Awards

Terry Brown has been awarded an ERC grant of approx £600K for his project *'Evolutionary origins of agriculture'.*

The BBSRC has awarded **Jason Micklefield** (PI), **David Leys** and **Finbarr Hayes** approx £640K for their collaborative project *"Orthogonal riboswitches as tools for controlling gene expression in bacteria".*
In this project we aim to develop orthogonal riboswitches that can induce as well as repress gene expression in a precise dose-dependent fashion, in response to synthetic ligands. We will show how the new genetic switches can be used to control the differential expression of multiple genes, including operons, simultaneously with no cross-talk, and we will engineer tandem riboswitches for amplification and digital control of gene expression. The application of the new riboswitches as tools for protein expression, synthetic biology and metabolic engineering will also be demonstrated. See previous work: Proc. Natl. Acad. Sci. USA 2010, 107, 2830 [Paper].

Jackpot! Five out of five new BBSRC resp. mode grants for Manchester Enzyme Groups [Scrutton, Munro, Leys, deVisser, Hay, Heyes, Rigby].
1) **Nigel Scrutton** (PI), **Sam Hay, Derren Heyes** and **Steve Rigby**. *"Dynamic structural science: exploring energy landscapes in complex enzyme systems"* £370K.
2) **Nigel Scrutton** (PI), **Derren Heyes, Steve Rigby** and **Sam deVisser** *"Acceleration and control of spin-restricted oxygenation by cofactor-independent dioxygenases"* £380K.
3) **Andrew Munro** (PI) and **David Leys**, "*Structure and mechanism of a key enzyme in M. tuberculosis cell envelope biogenesis"* £425K
4) **Andrew Munro** (PI) and **David Leys** *"A fragment based screening approach to rationalizing M. tuberculosis P450 molecular selectivity"* £420K.
5) **David Leys**, **Jason Micklefield** (PI) and **Nick Turner** *"Directed Evolution of Enantiocomplementary Malonate Decarboxylases" £320K*

Seminars & Events

TOP

Seminars in MIB

MIB International Seminar
Friday 22nd July 2011 12.00 MIB LT - **Dr Jennifer Potts** – University of York
Staphylococcal biofilm formation and normal and pathological interactions of fibronecting: protein tales of the unexpected.
Staphylococcal biofilm formation on prosthetic and in-dwelling devices is a substantial clinical problem. Biofilms are communities of bacteria that are resistant to antibiotics and to the host immune response: frequently device removal is the only way to resolve the infection. Biofilms can form through both polysaccharide and protein-mediated mechanisms. The first structural data for highly repetitive staphylococcal proteins that promote biofilm formation will be presented. Fibronectin is a human plasma and extracellular matrix protein. Its interactions with fibrin are important for clot stability and it is targeted by proteins on the surface of pathogenic bacteria during life-threatening infections such as infective endocarditis. Recent work to determine structures of, and identify binding sites in, fibronectin, fibrin, fibrinogen and bacterial proteins will be presented.

W L Bragg Lecture 2011 11 am, Tuesday July 19th 2011
Lecture Theatre G51, School of Chemistry
Professor Kostya Novoselov, The University of Manchester
Materials in the Flatland
Abstract: Graphene is a novel material with a number of unique properties. However, the most important one is that it has opened a floodgate for other two-dimensional (2D) crystals to be obtained. The current progress in 2D crystal isolation and growth can lead to a new paradigm of "complex materials on demand" by combining such 2D crystals into 3-dimensional layered structure. The number of different structures that one can obtain based on these strategies is practically unlimited and their physical properties are hard to predict a priori. Nevertheless, by understanding the properties of the 2D components, one should be able to create materials that have interesting structural, electronic, optical, mechanical and other properties.
The Lecture will be Chaired by the President of the International Union of Crystallography, Prof Sine Larsen of the University of Copenhagen.
Contact: Prof John R Helliwell DSc (john.helliwell@manchester.ac.uk)

Faculty of Life Sciences AZ Seminar series
Pharmacy http://www.pharmacy.manchester.ac.uk/aboutus/events/seminars2010/
School of Chemical Engineering and Analytical Science http://www.ceas.manchester.ac.uk/research/seminar/
School of Chemistry http://www.chemistry.manchester.ac.uk/research/seminars/
School of Computer Science http://www.cs.manchester.ac.uk/research/seminars/school/
School of Materials http://www.materials.manchester.ac.uk/aboutus/events/
School of Mathematics http://www.mims.manchester.ac.uk/events/
School of Physics and Astronomy http://www.physics.manchester.ac.uk/aboutus/events/
School of Mechanical, Aerospace and Civil Engineering http://www.mace.manchester.ac.uk/
School of Electrical and Electronic Engineering http://www.eee.manchester.ac.uk/aboutus/news/
School of Earth, Atmospheric and Environmental Sciences
http://www.seaes.manchester.ac.uk/aboutus/events/

Events

Friday 22nd July - FLS Summer Barbeque
12.30pm – 5.00pm Michael Smith Quad and Staff Lounge
Wild West Themed Sports Day
Meat and vegetarian BBQ
Subsidised Bar and Karaoke
ALL THIS FOR JUST £3!
Details of team registration for Sports day will be circulated by e-mail so watch out for the announcements! **Tickets on sale from 22nd June at MIB Reception**.

Faculty of Life Sciences Community Open Day
23rd July 2011 from 11am – 3pm. Michael Smith Building
All welcome, come along with your family, get hands on, meet the scientists!
www.manchester.ac.uk/lifesciences/openday

A Biochemical Society Focused Meeting: Structure and energetics in mammalian cells
11–13 October 2011 Manchester Interdisciplinary Biocentre, UK
Speakers: Andrew Halestrap, Clark Distelhorst, Emma Lundberg, Farid Khan, Gyorgy Hajnoczky, Hans Westerhoff, Jan Hoek, Llewelyn Roderick, Noel Clarke, Tatiana Rostovtseva, Viki Allan
Programme Committee: John Garland, Jan Hoek, Farid Khan, Tatiana Rostovtseva, Hans Westerhoff
Overview: The aim of this Focused Meeting is to explore how different intracellular structural

systems co-operatively manage energy supply and distribution. The novel meeting format is centred around discussion of system Modules, each one focusing on a specific cell structural component. Each Module is prefaced by an overview of its subject with emphasis on how cell architecture regulates, induces or manages energy provision and its distribution; or determines cell dynamic organization. A large proportion of the scientific programme will consist of free time for discussion and debate and all participants are actively encouraged to engage in and contribute to these discussions. Registration is by application only and all applicants are strongly encouraged to submit an abstract for presentation at the conference. Biochemical Society Transactions is the only publication to include this major international meeting and it is scheduled to appear in Issue 40(2).For a full programme please visit: www.biochemistry.org/conferences

Deadline extended until the 11th August 2011

Publications

Publication Highlight

Biospectroscopy at the Manchester Interdisciplinary Biocentre – **David Ellis** Review paper: *Bioanalysis* (2011) 3(11), 1189–1194

The Manchester Interdisciplinary Biocentre (MIB) at The University of Manchester (UK), is a large research facility located in central Manchester. The research undertaken in the MIB is said to address a number of grand challenges, including industrial biotechnology, energy and biofuels, and biomedical healthcare. These are realized via four main research themes: biomolecular mechanism and catalysis; synthetic and chemical biology; systems biology; and enabling technologies. This research spotlight focuses on biospectroscopy in the MIB, namely vibrational spectroscopies. This is just one area of research across just three of the many research groups in the MIB, which could be said to exemplify the fundamental and applied aspects of this field, its interdisciplinary nature and also the way it realizes several of the research themes and grand challenges already mentioned, with cutting edge and innovative research.

Publications

Brown, M., Wedge, D., Goodacre, R., Kell, D. B., Baker, P. N., Kenny, L. C., Mamas, M. A., Neyses, L. & Dunn, W. B. (2011). Automated workflows for accurate mass-based putative metabolite identification in LC/MS-derived metabolomic datasets. Bioinformatics 27, 1108-1112. Paper

R.D.M. O'Cualain, P.F.G. Sims and C.M. Carr Structural analysis of alpha-helical proteins from wool using cysteine labelling and mass spectrometry International Journal of Biological Macromolecules**.** Volume 49, Issue 3, 1 October 2011, Pages 323-330 Paper

Dunn WB, Broadhurst D, Begley P, Zelena E, Francis-McIntyre S, Anderson N, Brown M, Knowles JD, Halsall A, Haselden JN, Nicholls AW, Wilson ID, Kell DB, Goodacre R; The Human Serum Metabolome (HUSERMET) Consortium. Procedures for large-scale metabolic profiling of serum and plasma using gas chromatography and liquid chromatography coupled to mass spectrometry. Nat Protoc. 2011 Jun 30;6(7):1060-1083. doi: 10.1038/nprot.2011.335. Paper

Turner NJ. Enantioselective Oxidation of C-O and C-N Bonds Using Oxidases. Chem Rev. 2011 Jun 20. [Epub ahead of print] No abstract available. Paper

Bagabir RA, Syed F, Rautemaa R, McGrouther DA, Paus R, Bayat A. Upregulation of Toll-Like Receptors (TLRs) 6, 7, and 8 in Keloid Scars. J Invest Dermatol. 2011 Jun 16. Paper

Prest JE, Baldock SJ, Beardah MS, Doyle SP, Fielden PR, Goddard NJ, Treves Brown BJ. Thiocyanate and nitrite analysis using miniaturised isotachophoresis on a planar polymer chip. Analyst. 2011 Jun 14. [Epub ahead of print] Paper

Winder CL, Dunn WB, Goodacre R. TARDIS-based microbial metabolomics: time and relative differences in systems.Trends Microbiol. 2011 Jul;19(7):315-22. Epub 2011 Jun 12. Paper

Fletcher JS, Vickerman JC, Winograd N. Label free biochemical 2D and 3D imaging using secondary ion mass spectrometry. Curr Opin Chem Biol. 2011 Jun 8. Paper

Jim Warwicker. pK(a) predictions with a coupled finite difference Poisson-Boltzmann and Debye-Hückel method. Proteins. 2011 May 10. doi: 10.1002/prot.23078. [Epub ahead of print] Paper

Nicolaou N, Xu Y, Goodacre R. Fourier Transform Infrared and Raman Spectroscopies for the Rapid Detection, Enumeration, and Growth Interaction of the Bacteria Staphylococcus aureus and Lactococcus lactis ssp. cremoris in Milk. Anal Chem. 2011 Jun 27. [Epub ahead of print] Paper

Kolluru B, Hawizy L, Murray-Rust P, Tsujii J, Ananiadou S. Using workflows to explore and optimise named entity recognition for chemistry. PLoS One. 2011;6(5):e20181. Epub 2011 May 25. Paper

Kell DB, Dobson PD, Oliver SG. Pharmaceutical drug transport: the issues and the implications that it is essentially carrier-mediated only. Drug Discov Today. 2011 May 23. [Epub ahead of print] Paper

Perry DM, Bayat A. Reply: is adherent scar always nonpliable? Plast Reconstr Surg. 2011 Jun;127(6):2519-20. No abstract available. Paper

Iqbal SA, Manning C, Syed F, Kolluru V, Hayton M, Watson S, Bayat A. Identification of Mesenchymal Stem Cells in Perinodular Fat and Skin in Dupuytren's Disease: A Potential Source of Myofibroblasts with Implications for Pathogenesis and Therapy. Stem Cells Dev. 2011 May 25. [Epub ahead of print] Paper

Lloyd AJ, William Allwood J, Winder CL, Dunn WB, Heald JK, Cristescu SM, Sivakumaran A, Harren FJ, Mulema J, Denby K, Goodacre R, Smith AR, Mur LA. Plant J. Metabolomic approaches reveal that cell wall modifications play a major role in ethylene-mediated resistance against Botrytis cinerea. 2011 May 16. doi: 10.1111/j.1365-313X.2011.04639.x. [Epub ahead of print] Paper

Please send comments and items for inclusion in the next newsletter to:
Ros Le Feuvre (Next edition deadline 10th Sept)