

Synthetic Biology Publications

Selected publications from groups involved in Synthetic Biology research at Birmingham

Professor Steve Busby

D Lee, S Busby (2012) **Repression by cAMP receptor protein at a distance** (<http://mbio.asm.org/content/3/5/e00289-12.full.pdf>). *mBio* 3 e00289-12 doi 10.1128/mBio00289-12

M Elroh, C Webster, S Samarasinghe, D Durose, S Busby (2013) **Two DNA sites for MeIR in the same orientation are sufficient for optimal MeIR-dependent repression at the *Escherichia coli* meIR promoter** (<http://onlinelibrary.wiley.com/doi/10.1111/1574-6968.12027.pdf>). *FEMS Letters* 338 62-67

Professor Mark Cobbold

CA MacLennan et al (2010) **Dysregulated Humoral Immunity to Nontyphoidal Salmonella in HIV-Infected African Adults** (<http://www.sciencemag.org/content/328/5977/508.full.pdf?sid=648321fe-60f5-46a6-b79a-e1e0e43e1f5e>). *Science*. 328 508-12

F* Mohammed, M* Cobbold et al (2008) **Phosphorylation-dependent interaction between antigenic peptides and MHC class I: a molecular basis for the presentation of transformed self** (<http://www.nature.com/nijournal/v9/n11/pdf/ni.1660.pdf>). *Nature Immunology*. 9 1236-43

Professor Jeff Cole

S Alfasi, YR Sevastyanovich, L Griffiths, R Hall, J Cole (2011) **Use of GFP Fusions for the isolation of *Escherichia coli* strains for improved recombinant protein production** (http://ac.els-cdn.com/S016816561100486X/1-s2.0-S016816561100486X-main.pdf?_tid=83da1102-e32b-11e2-b92a-00000aacb35f&acdnat=1372778861_c10bf2886a21e5ec232475316349d9ae). *Journal of Biotechnology* 156 11-21

Y Sevastyanovich, S Alfasi, T Overton, R Hall, J Jones, C Hewitt, J Cole (2009) **Exploitation of GFP fusion proteins and stress avoidance as a generic strategy for the production of high quality recombinant proteins** (<http://onlinelibrary.wiley.com/doi/10.1111/j.1574-6968.2009.01738.x/pdf>). *FEMS Microbiology Letters* 299 86-94.

Dr Phil Cox

KA Littlejohn, P Hooley, PW Cox (2012) **Bioinformatics predicts diverse *Aspergillus* hydrophobins with novel properties** (http://ac.els-cdn.com/S0268005X11002542/1-s2.0-S0268005X11002542-main.pdf?_tid=ccf58374-e25b-11e2-a0e8-00000aacb360&acdnat=1372689648_066f2d08a5a4a20b105716605245150f). *Food Hydrocoll* 27 503-16.

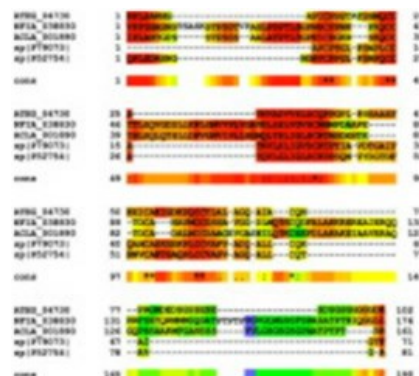


Image – Tcoffee alignment of Class II hydrophobins

GS Tucker, HM Brown, PJ Fryer, PW Cox, FL Poole, H-S Lee, MW Adams (2007) **A sterilisation time-temperature integrator based on amylase from the hyperthermophilic organism *Pyrococcus furiosus*** (http://ac.els-cdn.com/S1466856406000555/1-s2.0-S1466856406000555-main.pdf?_tid=f41c4b04-e25b-11e2-865b-00000aab0f01&acdnat=1372689714_ff072f71b2f2700ff5336ce1c7aabbf). *Innovative Food Science and Emerging Technologies (IFSET)* 8 63-72.

Dr Liam Cox

PJ Jervis, P Polzella, J Wojno, J-P Jukes, H Ghadbane, YR Garcia Diaz, GS Besra, V Cerundolo, LR Cox (2013) **Design, Synthesis and Functional Activity of Labeled CD1d Glycolipid Agonists** (<http://pubs.acs.org/doi/pdf/10.1021/bc300556e>). *Bioconjugate Chem.* 24 586-594.

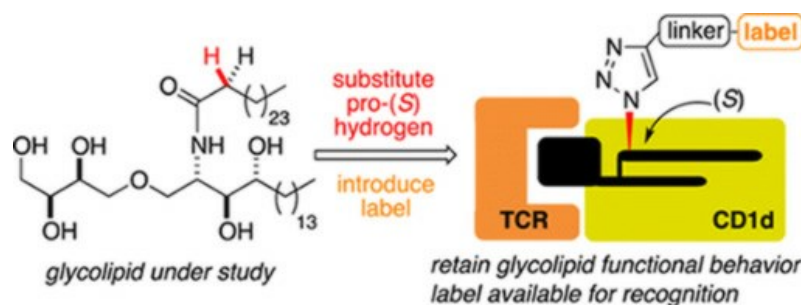


Image – Synthetic glycolipids for binding at the TCR-CD1d interface

PJ Jervis, M Moulis, J-P Jukes, H Ghadbane, LR Cox, V Cerundolo, GS Besra (2012) **Towards Multivalent CD1d Ligands: Synthesis and Biological Activity of Homodimeric α -Galactosyl Ceramide Analogues** (http://ac.els-cdn.com/S0008621512001085/1-s2.0-S0008621512001085-main.pdf?_tid=27b81752-e182-11e2-b9a7-00000aab0f6b&acdnat=1372596170_ff5752d3156c3e9ce780476667c615744). *Carbohydr. Res.* 356 152-162.

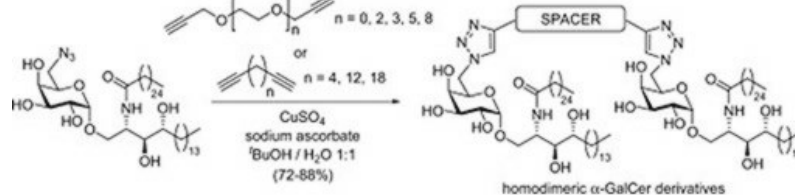


Image – Synthetic dimeric CD1d ligands containing two α -galactosyl ceramide linkers

Professor Tim Dafforn

R Pacheco-Gomez, J Kraemer, S Stokoe, HJ England, CW Penn, E Stanley, A Rodger, J Ward, MR Hicks, TR Dafforn (2012) **Detection of Pathogenic Bacteria Using a Homogeneous Immunoassay Based on Shear Alignment of Virus Particles and Linear Dichroism** (<http://pubs.acs.org/doi/pdf/10.1021/ac201544h>). *Analytical Chemistry* 84 91-97.

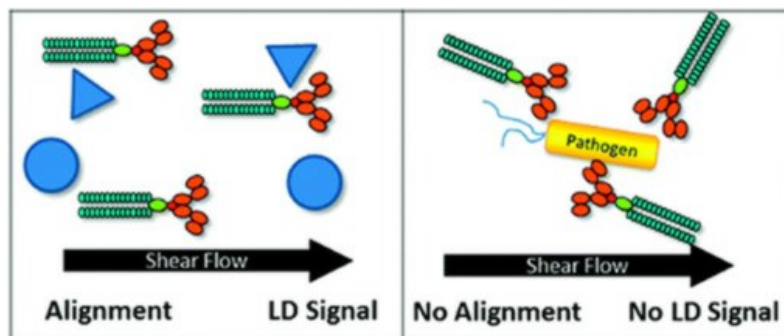


Image – Biomolecular detection coupling flow and linear dichroism

DJ Turner, I Portman, TR Dafforn, A Rodger, DI Roper, CJ Smith, MS Turner (2012) **The Mechanics of FtsZ Fibers** (http://ac.els-cdn.com/S0006349512000884/1-s2.0-S0006349512000884-main.pdf?_tid=b20c29b2-e26c-11e2-826a-00000aab0f6c&acdnat=1372696904_c9e1f0c66790c0fbcaf35d0aa977c9b8). *Biophysical Journal* 102 731-8.

Professor Heather Draper

H Kirkby, M Calvert, H Draper, T Keeley, S Wilson (2012) **What patients want to know about research: a systematic review** (<http://bmjopen.bmj.com/content/2/3/e000509.full.pdf+html>). *BMJ Open* 2:e000509

Dr Rosemary Dyson

RJ Dyson, LR Band OE Jensen (2012) **A model of crosslink kinetics in the expanding plant cell wall: Yield stress and enzyme action** (http://ac.els-cdn.com/S0022519312002251/1-s2.0-S0022519312002251-main.pdf?_tid=9fe66dfe-de59-11e2-abb5-00000aacb360&acdnat=1372248909_748204a6a764860df7e4eedb2634554c) *Journal of Theoretical Biology* 307, 125–136

LR Band, S Ubeda-Tomas, RJ Dyson, AM Middleton, TC Hodgman, MR Owen, OE Jensen, MJ Bennett JR King (2012) **Growth-induced hormone dilution can explain the dynamics of plant root cell elongation** (<http://www.pnas.org/content/109/19/7577.full.pdf>) *Proceedings of the National Academy of Science* 109 7577-7582 (<http://www.pnas.org/content/109/19/7577.full.pdf>)

Dr Francisco Fernández-Trillo

X Xue, G Pasparakis, N Halliday, K Winzer, SM Howdle, CJ Cramphorn, NR Cameron, PM Gardner, BG Davis, F Fernández-Trillo, C Alexander (2011) **Synthetic Polymers for Simultaneous Bacterial Sequestration and Quorum Sense Interference** (<http://onlinelibrary.wiley.com/doi/10.1002/anie.201103130/pdf>). *Angew. Chem., Int. Ed.* 50 9852–9856.

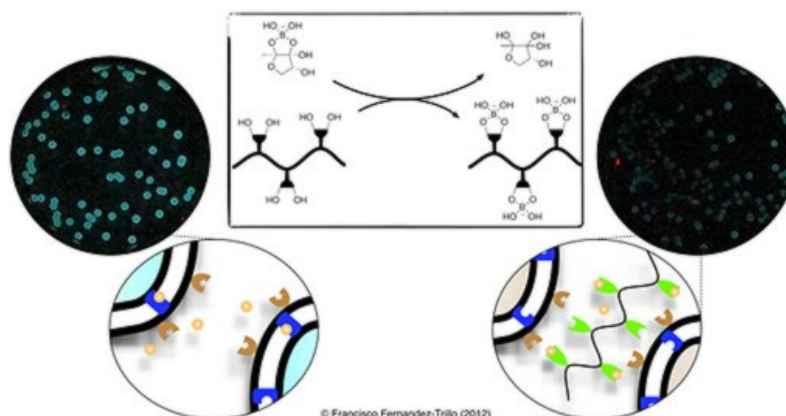


Image – Designed polymers which can both sequester *Vibrio harveyi* bacteria from suspensions and quench quorum sense signals.

J Smaldon, FJ Romero-Campero, F Fernández-Trillo, M Gheorghe, C Alexander, N Krasnogor (2010) **A computational study of liposome logic: towards cellular computing from the bottom up** (<http://link.springer.com/content/pdf/10.1007%2Fs11693-010-9060-5.pdf>). *Syst Synth Biol.* 4 157–179.

Professor Liam Grover

DC Bassett, LM Grover, FA Mueller, MD McKee, JE Barralet (2011) **Serum Protein Controlled Nanoparticle Synthesis** (<http://onlinelibrary.wiley.com/doi/10.1002/adfm.201100320/pdf>). *Advanced Functional Materials*, 21 2968-77.

NC Hunt, LM Grover (2010) **Cell encapsulation using biopolymer gels for regenerative medicine** (<http://link.springer.com/content/pdf/10.1007%2Fs10529-010-0221-0.pdf>). *Biotechnology Letters* 32 733-42.

Dr Sara Jabbari

S Jabbari, E Steiner, JT Heap, K Winzer, NP Minton, JR King (2013) **The putative influence of the agr operon upon survival mechanisms used by *Clostridium acetobutylicum*** (http://ac.els-cdn.com/S0025556413000771/1-s2.0-S0025556413000771-main.pdf?_tid=d3384f3a-e3fc-11e2-85d3-00000aacb361&acdnat=1372868759_7a7c535c704158d42f62f1bf460c15fb). *Math. Biosci.* 243 223-239.

GJ Thorn, JR King, S Jabbari (2013) **pH-induced gene regulation of solvent production by *Clostridium acetobutylicum* in continuous culture: Parameter estimation and sporulation modelling** (http://ac.els-cdn.com/S0025556412002118/1-s2.0-S0025556412002118-main.pdf?_tid=029509a8-e3fd-11e2-accf-00000aab0f26&acdnat=1372868838_d2d3cbafbec081292dc34dd79e19357b). *Math. biosci.* 241 149-166.

Professor Roy Johnston

MT Oakley, DJ Wales, RL Johnston (2011) **Energy Landscape and Global Optimisation for a Frustrated Model Protein** (<http://pubs.acs.org/doi/pdf/10.1021/jp207246m>). *J. Phys. Chem. B* 115 11525-11529.

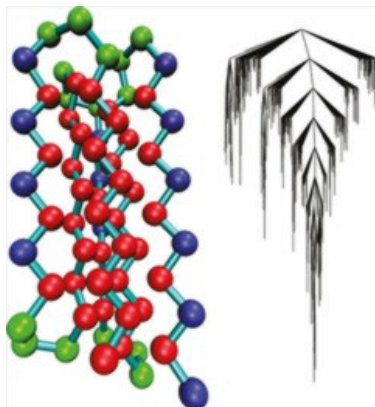


Image – Disconnectivity graph representing the energy landscape of a three-color (BLN) 69-residue model protein

MT Oakley, E Oheix, AFA Peacock, RL Johnston (2013) **Computational and Experimental Investigations into the Conformations of Cyclic Tetra-alpha/beta-Peptides** (<http://pubs.acs.org/doi/pdf/10.1021/jp4043039>). *J. Chem. Phys. B*, DOI: 10.1021/jp4043039.

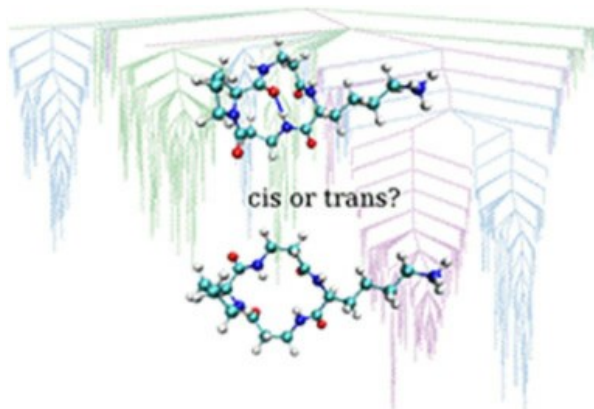


Image – Disconnectivity graph representing the energy landscape of a cyclic tetrapeptide

Dr Jan-Ulrich Kreft

LA Lardon, BV Merkey, S Martins, A Dötsch, C Picioreanu, JU Kreft, BF Smets (2011) **iDynoMiCS: next-generation individual-based modelling of biofilms** (<http://onlinelibrary.wiley.com/doi/10.1111/j.1462-2920.2011.02414.x/pdf>). *Environmental Microbiology* 13 2416-2434

CM Costello, JU Kreft, CM Thomas, DM Hammes, P Bao, SD Evans, PM Mendes (2012) **Exploiting additive and subtractive patterning for spatially controlled and robust bacterial co-cultures** (<http://pubs.rsc.org/en/content/articlepdf/2012/sm/c2sm26111a>). *Soft Matter* 8 9147-9155

Dr Peter Lund

NA Burton, MD Johnson, P Antczak, A Robinson, PA Lund (2010) **Novel aspects of the acid response network of *E. coli* K-12 are revealed by a study of transcriptional dynamics** (http://ac.els-cdn.com/S0022283610006972/1-s2.0-S0022283610006972-main.pdf?_tid=01ffe48e-e1ac-11e2-b0b9-00000aacb360&acdnat=1372614146_f3a63de5f71a70f9c9889612813447d4). *J Mol Biol.* 401 726-42

A Stincone, N Daudi, AS Rahman, P Antczak, IR Henderson, JA Cole, PA Lund, F Falciani (2011) **A systems biology approach sheds new light on *Escherichia coli* acid resistance** (<http://nar.oxfordjournals.org/content/early/2011/06/19/nar.gkr338.full.pdf+html>). *Nucleic Acids Res.* 39 7512-28

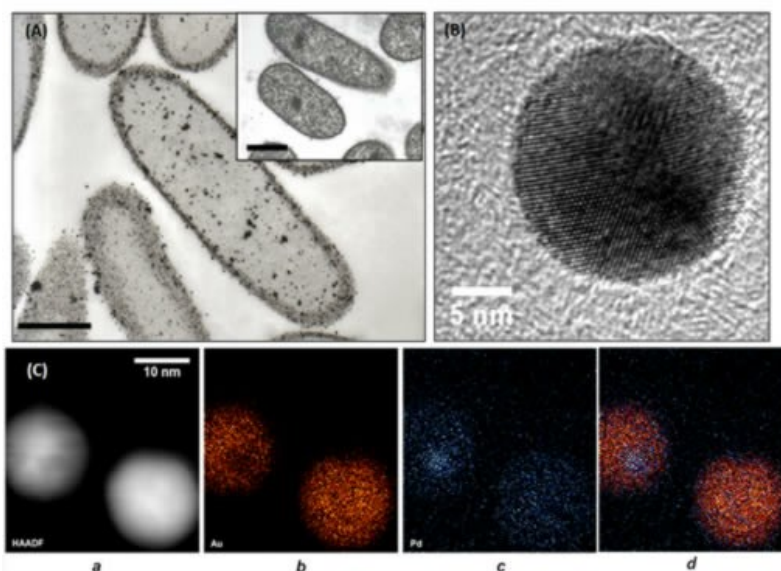


Image - Electron microscopy of metallized *E. coli* cells

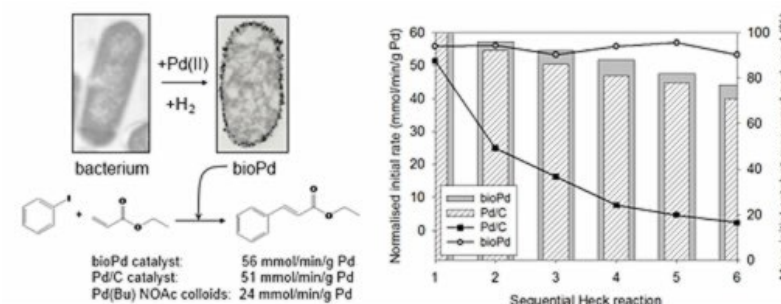


Image - Palladium nanoparticles supported on bacterial biomass capable of catalysing the Heck reaction

Dr Paula Mendes

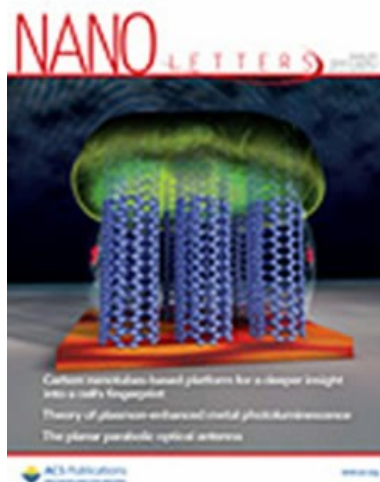


Image - Journal cover illustrating vertically aligned single walled carbon nanotubes for sensing of eukaryotic cells

ON - Bacteria Attractive OFF - Bacteria Repellent



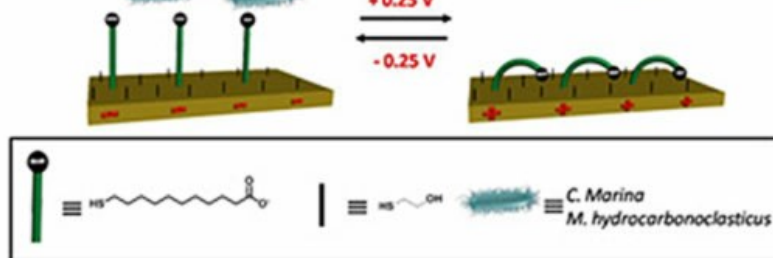


Image – Design and study of an electrical switchable bacterial adhesion surface

Dr Tim Overton

M Winn, JM Foulkes, S Perni, MJH Simmons, TW Overton, RJM Goss (2012) **Biofilms and their Engineered Counterparts: a new Generation of Immobilised Biocatalysts** (<http://pubs.rsc.org/en/content/articlepdf/2012/cy/c2cy20085f>). *Catalysis Science and Technology* 2 1544-1547

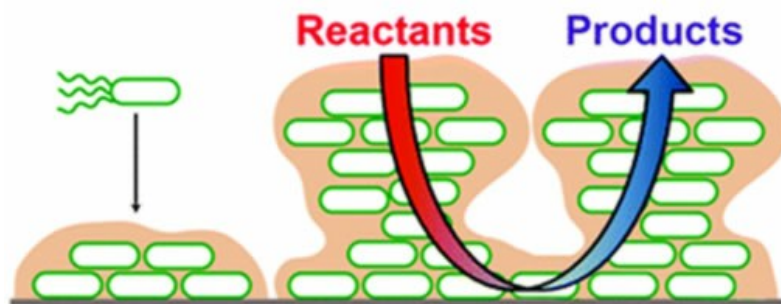


Image – Single species biofilms for specific biotransformations

AN Tsoiligkas, M Winn, J Bowen, TW Overton, MJH Simmons, RJM Goss (2011) **Engineering Biofilms for Biocatalysis** (<http://onlinelibrary.wiley.com/doi/10.1002/cbic.201100200/pdf>). *ChemBioChem* 12 1391-1395

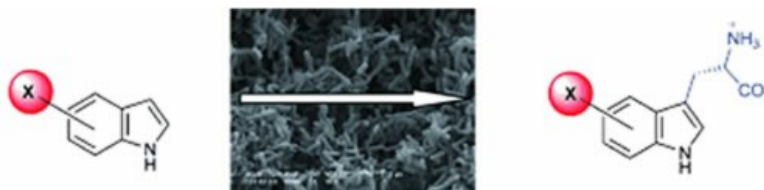


Image – Single species biofilms for specific biotransformations

Dr Anna Peacock

AFA Peacock, GA Bullen, L Gethings, JP Williams, FH Kriel, J Coates (2012) **Gold-Phosphine Binding to De Novo Designed Coiled Coil Peptides** (http://ac.elsa-cdn.com/S016201341200178X/1-s2.0-S016201341200178X-main.pdf?_tid=b5f4181a-e25c-11e2-b04d-00000aab0f26&acdnat=1372690039_98918fd457722ac31260377302482250). *J. Inorg. Biochem.* 117 298-305.

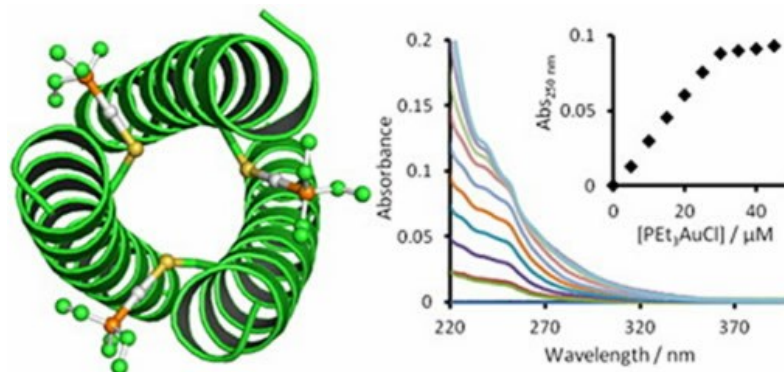


Image - Gold triethylphosphine, analogous to the antiarthritic drug auranofin, coupled to a de novo designed coiled coil through a single cysteine

M Zastrow, AFA Peacock, J Stuckey, VL Pecoraro (2012) **Hydrolytic Catalysis and Structural Stabilization in a Designed Metalloprotein** (<http://www.nature.com/nchem/journal/v4/n2/full/nchem.1201.html#access>). *Nature Chem.* 4 118-123.



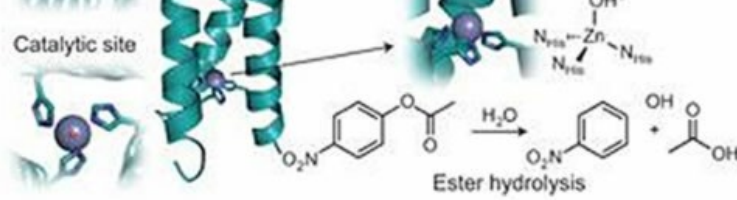


Image - First de novo designed hydrolytic metalloenzyme

Dr Zoe Pikramenou

A Davies, DJ Lewis, SP Watson, SG Thomas, Z Pikramenou (2012) **pH-controlled delivery of luminescent europium coated nanoparticles into platelets** (<http://www.pnas.org/content/early/2012/01/17/1112132109.full.pdf+html>), *Proceedings of the National Academy of Sciences of the United States of America* 109 1862-1867.

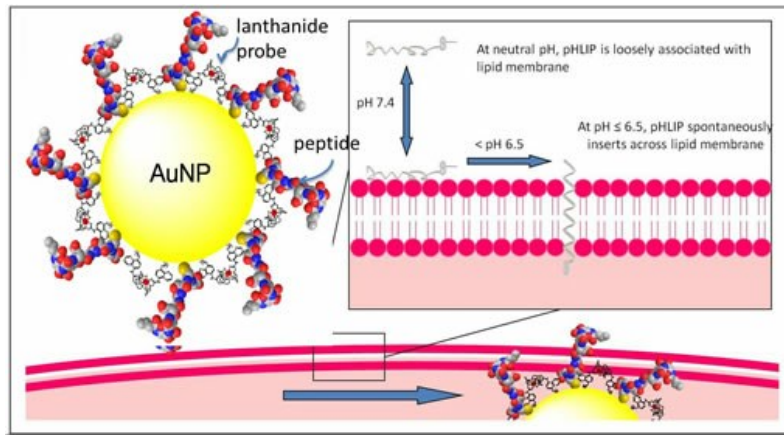


Image - Luminescent europium and pH low inserting peptide coated nanoparticles for pH controlled delivery into platelets

DJ Lewis, C Bruce, S Bohic, P Cloetens, SP Hammond, D ARBON, S Blair-Reid, Z Pikramenou, B Kysela (2010) **Intracellular synchrotron nanoimaging and DNA damage/genotoxicity screening of novel lanthanide-coated nanovectors** (<http://www.futuremedicine.com/doi/pdf/10.2217/nnm.10.96>), *Nanomedicine*, 5 1547-1557

Professor Jon Preece

M Soliman, R Nasanit, SR Abdulateefeh, S Allen, MC Davies, SS Briggs, LW Seymour, JA Preece, AM Grabowska, SA Watson, CA Alexander (2012) **Multicomponent Synthetic Polymers with Viral-Mimetic Chemistry for Nucleic Acids** (<http://pubs.acs.org/doi/pdf/10.1021/mp200108q>), *Molecular Pharmaceutics*, 9 1-13.

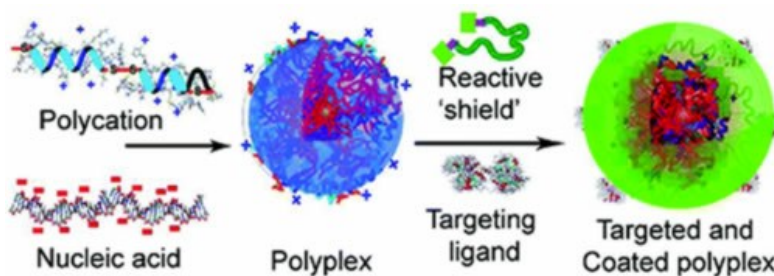


Image - Synthetic multicomponent materials developed for gene delivery

M Soliman, RNasanit, M Davies, S Allen, JA Preece, C Alexander (2010) **Interaction of Reducible Polypeptide Gene Delivery Vectors with Supported Lipid Bilayers: Pore Formation and Structure Function Relationships** (<http://pubs.rsc.org/en/content/articlepdf/2010/sm/b927204f>), *Soft Matter*, 6 2517-2524.

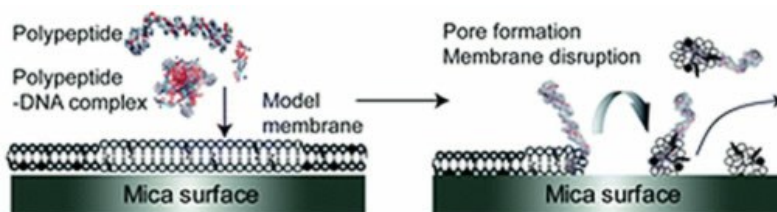
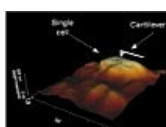


Image - interactions of synthetic disulfide-linked polypeptide gene delivery vectors with supported phospholipid bilayers probed by AFM.

Professor Mark Simmons

AN Tsoiligkas, J Bowen, M Winn, RJM Goss, TW Overton, MJH Simmons (2012) **Characterisation of spin coated engineered *Escherichia coli* biofilms using atomic force microscopy** (http://ac.els-cdn.com/S0927776511005145/1-s2.0-S0927776511005145-main.pdf?_tid=bf1c73a2-e17f-11e2-b8f3-00000aab0f6b&acdnat=1372595136_161f2887e1cf129dcd442aa712fba4c). *Colloids and Surfaces B: Biointerfaces* 89 152-160



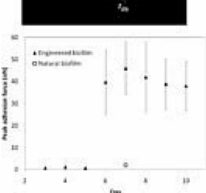


Image - surface properties and adhesive strength of biofilms studied by AFM

AN Tsoiligkas, M Winn, J Bowen, TW Overton, MJH Simmons, RJM Goss (2011) **Engineering Biofilms for Biocatalysis** (<http://onlinelibrary.wiley.com/doi/10.1002/cbic.201100200/pdf>). *ChemBioChem* 12 1391-1395

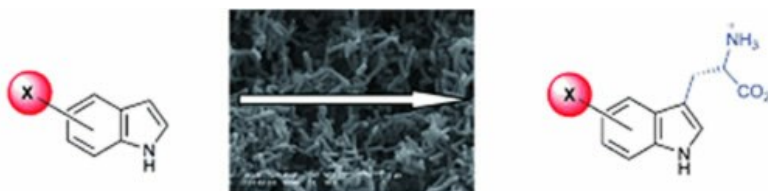


Image – Single species biofilms for conversion of serine and haloindoles to halotryptophans

Dr Dave Smith

JRA McLachlan, DJ Smith, NP Chmel, A Rodger (2013) **Calculations of flow-induced orientation distributions for analysis of linear dichroism spectroscopy** (<http://pubs.rsc.org/en/content/articlepdf/2013/sm/c3sm27419e>). *Soft Matt.* 9 4977-4984

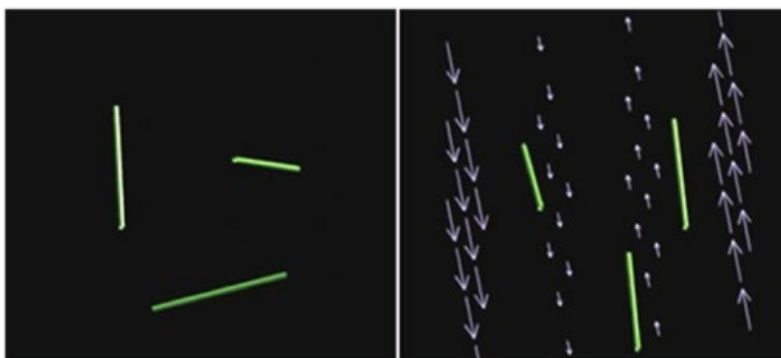


Image – Calculated and experimental linear dichroism orientation of M13 bacteriophage under flow conditions.

W Artl, M Biehl, AE Taylor, S Hahner, R Libé, BA Hughes, P Schneider, DJ Smith, H Stiekema, N Krone, E Porfiri, G Opocher, J Bertherat, F Mantero, B Alliolio, M Terzolo, P Nightingale, CHL Shackleton, X Bertagna, M Fassnacht, PM Stewart (2011) **Urine steroidobolomics – combining mass spectrometry-based steroid profiling and machine learning for detecting adrenal malignancy** (<http://jcem.endojournals.org/content/96/12/3775.full.pdf+html>). *J. Clin. Endocrinol. Metab.* 96 3775-3784

Professor Chris Thomas

AC Murphy, D Fukuda, Z Song, J Hothersall, RJ Cox, CL Willis, CM Thomas, TJ Simpson (2011) **Novel Thiomarinol antibiotics active against MRSA are generated by mutagenesis and mutasynthesis of *Pseudoalteromonas* SANK73390** (<http://onlinelibrary.wiley.com/doi/10.1002/anie.201007029/pdf>). *Angewandte Chemie International Edition* 50 3271–3274.

J Hothersall, J Wu, A Murphy, J Shields, E Stephens, H Cooper, G Campbell, P Williams, CL Willis, TJ Simpson, CM Thomas (2011) **Manipulation of quorum sensing regulation in *Pseudomonas fluorescens* NCIMB 10586 to increase mupirocin production** (http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s00253-011-3145-2&sa_campaign=Email/ACE/Paginated). *Applied Microbiology and Biotechnology* 90 1017-1026.

Professor James Tucker

HV Nguyen (<http://pubs.rsc.org/en/results?searchtext=Author%3AHuy%20V.%20Nguyen>), Z-Y Zhao (<http://pubs.rsc.org/en/results?searchtext=Author%3AZheng-yun%20Zhao>), A Sallustrau (<http://pubs.rsc.org/en/results?searchtext=Author%3AAntoine%20Sallustrau>), SL Horswell (<http://pubs.rsc.org/en/results?searchtext=Author%3ASarah%20L.%20Horswell>), L Male (<http://pubs.rsc.org/en/results?searchtext=Author%3ALouise%20Male>), A Mulas (<http://pubs.rsc.org/en/results?searchtext=Author%3AAndrea%20Mulas>), JHR Tucker (<http://pubs.rsc.org/en/results?searchtext=Author%3AJames%20H.%20R.%20Tucker>) (2012) **A ferrocene nucleic acid oligomer as an organometallic structural mimic of DNA** (<http://pubs.rsc.org/en/content/articlelanding/2012/cc/c2cc36428j>). *Chem. Commun.* 48 12165-12167

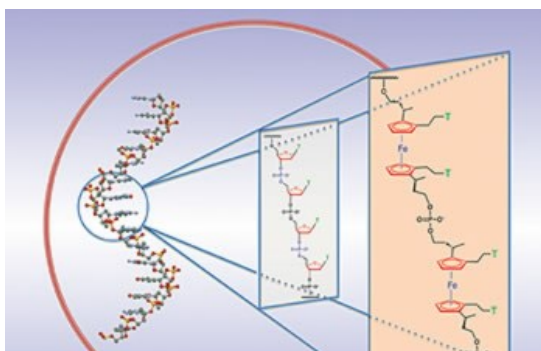




Image – Synthetic ferrocene nucleic acid oligomer

Dr Peter Winn

DB Kokh, S Corni, PJ Winn, M Höfling, RR Gabdoulhine, KE Gottschalk, RC Wade (2010) **ProMetCS: An Atomistic Force Field for Modeling Protein-Metal Surface Interactions in a Continuum Aqueous Solvent** (<http://pubs.acs.org/doi/pdf/10.1021/ct100086j>). *J. Chem. Theory and Comp.* **6** 1753-1768.

AS Haines, X Dong, Z Song, R Farmer, C Williams, J Hothersall, E Płoskoń, P Wattana-amorn, ER Stephens, E Yamada, R Gurney, Y Takebayashi, J Masschelein, RJ Cox, R Lavigne, CL Willis, TJ Simpson, J Crosby, PJ Winn, CM Thomas, MP Crump, A conserved motif flags Acyl Carrier Proteins for β -branch insertion during type-I polyketide synthesis, *Nature Chemical Biology* *Biology* **9**, 685–692 (2013) doi:10.1038/nchembio.1342

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