

EASTBIO DTP Research Training
Bioenergy & Industrial Biotechnology Priority Area
2014 Schedule

Sessions	Session Date	Session Tutor(-s)	Session Topic
Session 1	13 Jan 2013	BIB Introductory meeting, with students' presentations <i>University of Edinburgh</i>	
Session 2	Fri 7 March 2014, 13.00-15.00	Dom Campopiano & Chris McLean	Industrial Biocatalyst field Suggested papers: <ul style="list-style-type: none"> 'An improved racemase/acylase biotransformation for the preparation of enantiomerically pure amino acids' http://www.ncbi.nlm.nih.gov/pubmed/23130969 A paper from Nick Turner in PNAS 2012 http://www.ncbi.nlm.nih.gov/pubmed/23248280
Session 3	Fri 21 March, 14.00-16.00	Scott Cockroft & Justin Slikas	Topic for discussion: "Are there significant ethical issues to consider in the area of Synthetic Biology, even at this early stage?" Reading materials: <ul style="list-style-type: none"> 'One-step assembly in yeast of 25 overlapping DNA fragments to form a complete synthetic Mycoplasma genitalium genome', by Daniel Gibson et al., <i>Science</i> 340, 48 (2013); 'Tissue-Like Printed Material', by Gabriel Villar, Alexander D. Graham, Hagan Bayley http://www.theguardian.com/commentisfree/2013/mar/23/de-extinction-efforts-are-waste-of-time-money
Session 4	9 April, 15.00-17.00	Frank Sargent	Reading materials: <ul style="list-style-type: none"> Yong Jun Choi & Sang Yup Lee, 'Microbial production of short-chain alkanes', <i>Nature</i> 502 (24 October 2013), 571-5. Bruce E. Logan, 'Exoelectrogenic bacteria that power microbial fuel cells', <i>Microbiology</i> 7 (May 2009), 375-81.
Session 5	25 April, 14.00-16.00	Andrew Free & Julian Pietrzyk	Topic for discussion: "Can we predict function for microbial bioreactor systems?"

			<p>Reading materials:</p> <ul style="list-style-type: none"> Langille, M.G.I. et al. (2013). Predictive functional profiling of microbial communities using 16S rRNA marker gene sequences. <i>Nature Biotechnol.</i> 31: 814-21. Reed, D.C. et al. (2014). Gene-centric approach to integrating environmental genomics and biogeochemical models. <i>Proc. Natl. Acad. Sci. USA</i> 111: 1879-84
Session 6	8 May, 13.00-15.00	Alison Hulme & Richard Brewster	<p>Topic for dicussion: “Manipulating the widely used biotin-(strept)avidin system” [PDB file 2AVI]</p> <p>Reading materials (<i>sent via attachment</i>):</p> <ul style="list-style-type: none"> ‘Triazole biotin: a tight-binding biotinidase-resistant conjugate’, Anne I. Germeroth et al., <i>Organic and Biomolecular Chemistry</i>, 2013, 11, 7700 ‘Brave new (strept)avidins in biotechnology’, Olli H. Laitinen, Henri R. Nordlund, Vesa P. Hytonen and Markku S. Kulomaa, <i>TRENDS in Biotechnology</i>, 2007, 25, 269
Session 7	16 May, 10.15-12.00	Paul Kamer	<p>Topic for dicussion: “The development of artificial enzymes which employ non-natural metals/ligands”</p> <p>Points for consideration are:</p> <ul style="list-style-type: none"> What are the pro and cons of biocatalysis vs homogeneous (transition metal) catalysis? Why does nature not exploit late transition metals such as Ru, Rh, Pd or Ir which are so powerful in chemocatalysis? What options do we have to introduce these catalytic metals into proteins? What are the pros and cons of each modification method? Why would we want to do that where nature obviously chose not to do so? What impact do different types of artificial enzymes have on the process of catalyst optimization <p>Suggested papers: Papers by Tom Ward and some of his own work. This includes bioconjugation methods of cofactors and catalytic reactions, including ones for which we have no enzymes available.</p> <ul style="list-style-type: none"> ‘X-Ray Structure and Designed Evolution of an Artificial Transfer Hydrogenase’ Marc Creus, Anca Pordea, Thibaud Rossel, Alessia Sardo, Christophe Letondor, Anita Ivanova, Isolde LeTrong, Ronald E. Stenkamp, and Thomas R. Ward <i>Angew. Chem. Int. Ed.</i> 2008, 47, 1400–1404. DOI: 10.1002/anie.200704865 ‘Highly efficient and site-selective phosphane modification of proteins via hydrazone linkage for the development of artificial metalloenzymes’ P. J. Deuss, G. Popa, C. H. Botting, W. Laan, P. C. J. Kamer. <i>Angew. Chem., Int. Ed.</i> 2010, 49, 5315. DOI: 10.1002/anie.201002174

			<ul style="list-style-type: none"> • 'A Dual Anchoring Strategy for the Localization and Activation of Artificial Metalloenzymes Based on the Biotin–Streptavidin Technology' J. M. Zimbron, T. Heinisch, M. Schmid, D. Hamels, E. S. Nogueira, T. Schirmer, T. R. Ward <i>J. Am. Chem. Soc.</i> 2013, <i>135</i>, 5384–5388. dx.doi.org/10.1021/ja309974s
Session 8	Wednesday 28 May, 10.00- 12.00	Jon Marles-Wright	<p>Topic for discussion: Engineering metabolic compartmentalisation in bacteria</p> <p>Questions: What biological questions do we need to address before we can rationally engineer metabolic compartments?</p> <p>Papers:</p> <ul style="list-style-type: none"> • Chen AH, Silver PA (2012) Designing biological compartmentalization. <i>Trends Cell Biol</i> 22: 662–670. doi:10.1016/j.tcb.2012.07.002 • Frank S, Lawrence AD, Prentice MB, Warren MJ (2013) Bacterial microcompartments moving into a synthetic biological world. <i>J Biotechnol</i> 163: 273–279. doi:10.1016/j.jbiotec.2012.09.002
Session 9	Friday 20 June, 13.00- 15.00	Isabelle Colas	<p>Topic for discussion: Modulation of crossing over in barley</p> <p>Presentation by Colas on “The control of meiosis and recombination in barley”, including some ways to create or utilize mutants.</p> <p>Paper: Barakate, Abdellah, et al., ‘The Synaptonemal Complex Protein ZYP1 Is Required for Imposition of Meiotic Crossovers in Barley’, <i>The Plant Cell</i> 26 (2014): 729–40</p>
Session 10	Friday 27 June, 13.00- 15.00	Annamaria Lilienkampf	<p>Topic for discussion: “Strategies for repelling bacteria”</p> <p>Papers:</p> <ul style="list-style-type: none"> • http://pubs.rsc.org/en/Content/ArticleLanding/2011/JM/c0jm01987a#!divAbstract • http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.1004152

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