

Website update

Many thanks for the positive feedback regarding the website. Unfortunately time restrictions did not allow a demonstration of the pages at the last workshop, but I'll just run through a few things that I may have mentioned, given time.

The 'Bulletin Board' on the right-hand side of the front page has (relatively) regularly updated info that you may want to keep track of. Lookout for updates about Gregynog 2005.

Of the new additions/modifications there are some areas that need your help! The main areas where I'm looking for contributions are in the 'Research Groups' pages (from group leaders) and the 'News' pages. The first research posts were advertised here recently and this is just the sort of thing that the space is for. The 'International' pages are for similar posts from overseas. There are now more hits per day on the site from Europe than from the UK.....please feel free to mail me meeting info/adverts if you're reading from outside the UK.

Mat

Biofilm Today!

Microbiology Today, the Society for General Microbiology's award winning magazine, is featuring 'Communities' in a New Year issue. We were invited to contribute by sending some information about the Club, and this Mat has done, so look out for our entry. Incidentally, Jo Verran is the recipient of the 2005 SGM's Peter Wildy prize for Microbiology Education. Read below for some information on Biofilm Education!



Biofilms: The Hypertextbook

Biofilms: the Hypertextbook is a pilot project teaching and learning resource for undergraduate science and engineering education in biofilms.

The hypertextbook is accessible through standard web browsers, and has the technology to incorporate videos, high resolution images, narrated slide shows, PowerPoint presentations, and interactive models of biofilm processes. Content will be organized as modules intended to supplement textbook material in multiple disciplines and will be designed to accommodate different learning levels and needs through a special hyperlinked structure. The project goal is to meet the evident need for resources that make it possible to incorporate biofilm instruction into undergraduate curricula.

The project team plans to have a demonstration module of the hypertextbook ready for evaluation and classroom use by Spring Semester 2005. The topic chosen for the demonstration module is "Diffusion in Biofilms," a key concept in the treatment and control of biofilms. The content of this module will come from a long-running course in Biofilms taught by Phil Stewart of the Center for Biofilm Engineering at Montana State University, summarized in his recent paper, "Diffusion in Biofilms," J Bacteriol Mar 2003; 185(5):1485-1491.

The project team will be looking for people who can provide feedback on this demonstration module. Feedback can range from subjective review and comment about the structure and content of the hypertextbook, to formal classroom evaluation.

Updates about the project can be found on the BiofilmsOnline.com website at:
http://www.biofilmsonline.com/cgi-bin/biofilmsonline/activities.html?id=DJAJTwBb&mv_pc=11983

Please send email to diane_w@erc.montana.edu, to indicate if you would like to be an evaluator of this chapter on "Diffusion in Biofilms" during Spring Semester 2005.

*Happy Christmas
to all our readers!*

thebiofilmclub

NEWSLETTER

www.biofilmclub.co.uk

December 2004

**Gregynog 2005 7 - 9 September:
the planning begins!
Pre-registration information enclosed
Deadline 31st January 2005**

Gregynog 2005

Book now to avoid disappointment!

Unbelievably it is time to start thinking about Gregynog 2005 and volume 7 of the best selling accompanying BBC book series. We as a committee are now at the stage of planning the programme for the next residential meeting of the biofilm club at Gregynog Hall, Powys, Wales. The meeting will commence on the afternoon of Wednesday 7th September and finish at lunchtime on Friday 9th September. Accommodation will be available for people to stay over at Gregynog Hall for the Friday and Saturday nights if required. There will be an additional charge for this and early booking is advisable.

As with previous Gregynog meetings it is our intention that the topics covered by the meeting reflect the interest of the membership. The content will, therefore, be determined by **YOU**, as indicated by your willingness to contribute a short (c. 10min) talk. Each session will hopefully be fronted by a keynote speaker delivering a 20-30 min plenary talk.

Club Committee:

David Allison, Treasurer and Membership Secretary.

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Jon Pratten, General Secretary,

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Dave Spratt, workshop co-ordinator,

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Joanna Verran, Newsletter Editor

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Mat Upton, Webmaster. Mat.Upton@man.ac.uk

Andrew McBain, Gregynog 2005, and reports

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In previous years there has been a slight over-subscription to attend the meeting. Ideally, 100 delegates maximum is comfortable. Completing and returning the pre-registration form, along with a suggested title, will ensure that you have a reserved place. Postgraduate student members who have been studying for 18 months or less are not required to offer a talk unless they wish to. They should, however, indicate on the pre-registration form their area of interest. **The deadline for pre-registration will be 31st January 2005.** The committee will select between 25-30 offered talks for oral presentation and discussion, notice of which will be given to all pre-registrants by February 14th. Titles will be selected in order to maintain a fairly balanced programme.

Those selected for oral presentation at Gregynog **MUST** produce a manuscript for inclusion within the accompanying book (BBC 7) by May 1st 2005. Members who offer talks that are not included in the programme will be invited to contribute short (2-3 page) manuscripts for publication if they so desire. In this manner BBC 7 (title yet to be decided) will provide a comprehensive, up-to-date review of the interests of the club in addition to documenting the Gregynog programme. It is essential that deadlines be strictly adhered to if the book is to be available for distribution at the meeting. Referees will be under strict orders to reject any manuscript that does not comply with the guidelines.

If you wish to attend the Gregynog meeting and want to make a presentation, then please complete the enclosed pre-registration form and return it to Dr Andrew McBain, School of Pharmacy, University of Manchester, Manchester M13 9PL, UK by the end of January.

Please Note: Only paid-up members of the Biofilm Club are eligible to attend Gregynog.

Workshops

Watch this space for information on the next (before Easter) workshop. If you have ideas for topics, suggestions for other societies to collaborate with, or want to host an event, please contact Dave Spratt.

November Workshop Report:MODELLING BIOFILM SYSTEMS

**GREGYNOG 2005
Pre-Registration**

In Manchester the sun was shining and the undergraduates were on a mid-semester break. What more could one ask for? Well, perhaps an enthralling Biofilm Club workshop discussing the modelling of biofilm systems. The aim of this workshop was to review the use and application of biofilm models in a variety of research programmes, past and present. Although similarly themed workshops have been held in the past, over 60 delegates attending was testament to the continued interest in this topic. The morning session focussed on models used to investigate the oral cavity and biotic surfaces. Jon Pratten was due to give the opening address but was unavoidably detained in London. Consequently, Dave Spratt (Eastman Dental Institute, UCL) very gallantly stepped in at the last minute and gave an excellent rendition of Jon's talk, providing an overview of the various approaches that have been used over the years to model the oral cavity. Not too surprisingly, a good proportion of the talk extolled the virtues of the CDFP as an appropriate model with wide-ranging applicability. In the discussion afterwards concern was raised as to the availability of CDFP models now that Professor Wimpenny has retired. A worthy suggestion was that the Biofilm Club sponsored the manufacture of such devices.

Perhaps an understudied aspect of the oral cavity is the tongue, but in his talk on oral malodour, John Greenman (UWE, Bristol) provided us with plenty of examples why the microbial community on the tongue should be studied. For this John described the use of a single, slightly modified Sorbarod model. With appropriate controls, stable, reproducible representations of a tongue microcosm that realistically models malodour production has been produced. John's lab must be a pleasant place to work in ...!

The last speaker in this session was Phil Watson from Leeds who described a very elegant in-situ model used to examine film formation on enamel surfaces. Because of the requirements for ethical and patient approval the approach is not one that could be used widely by other labs. However, the beauty of the model is that it generates 'real-life' biofilms. Questions mainly focussed on the ease of application / removal of the device (where Phil could comment from first-hand experience), reproducibility between 'patients' and influence of diet on the oral flora. It was interesting to note however that patients were asked not to use a toothbrush on the test area.

From the mouth we moved very rapidly to the lower regions of the GI tract (yes, gums to bums again) where Graeme O'May from the University of Dundee described a two-stage chemostat system, each of which contained a series of substrates immobilised within coupons or 'baits' to allow biofilm development. The intention was to mimic substrate utilisation as it might occur in sequential regions of the large intestine. Since mucin and undigested food particles represent a major substrate for biofilm formation in the large bowel, the use of these baits enables the population dynamics of gut biofilm formation to be modelled and allows the concomitant determination of substrate utilisation and fermentation product production. Graeme showed that, for example, bacteria with mucin degradative capabilities were able to rapidly colonise and penetrate mucin baits and that gut biofilms altered their enzyme expression according to the substrate composition of the baits.

The last talk before lunch was from Andrew Middleton (GSK) who described a method used in a previous life to model Mycobacterial colonisation of respiratory mucosa. This was beautifully illustrated with series of crisp EM images showing Mycobacterial microcolony formation. This was perhaps a timely re-visit to this data given the increased awareness and knowledge associated with the re-emergence of TB.

Following an informal lunch at the KroBar the meeting resumed with a session concentrating on modelling susceptibility and antibiotic resistance. Peter Gilbert (University of Manchester) critically evaluated some of the systems sometimes used to determine the susceptibility of biofilms to

antimicrobials. These included agar plate membrane methods and systems that dry planktonic cultures onto inert surfaces in an effort to model a sessile community. Peter suggested that the advantages of such systems include good reproducibility, but that more complex systems which include continuous culture with suspended substrata, the CDFP and the Sorbarod (and multiple Sorbarod) device might be more realistic for examining the susceptibility of more complex cultures. Peter went on to discuss some novel methods for creating biofilms for antimicrobial testing. These included biofilms constructed within poloxamer hydrogels, which are liquid when refrigerated, becoming robust gels during incubation. He then went on to discuss a novel method whereby lectins can be used to assemble multi-species biofilms in an ordered manner, enabling the modelling of synergistic protection from biocides.

Antibiotic resistance (and its transfer) is becoming a major concern with respect to treatment of bacterial infections especially in a hospital setting. Adam Roberts (Eastman Dental Institute, UCL) presented some novel work describing a microcosm CDFP model of the oral cavity which demonstrated that tetracycline resistance transfer (via conjugative transposons) can occur between a range of taxa of the normal oral microbiota. Additionally and perhaps more worryingly he also provided evidence for the transfer of antibiotic resistance from *Bacillus subtilis* (a transient species) to a member of an established oral biofilm community within 6 hours of the initial inoculation. This therefore demonstrated that transient bacteria which are not normally considered part of the normal oral flora may have the ability to transfer genetic information to normal oral bacteria when they pass through the oral cavity on particles of food etc.

Gerard Marx (University of Manchester) presented some work on micro-fabrication of biofilms. This technique, using a "bottom up" approach, is able to create 3-dimensional biofilms with known spatial organization. The technology utilises photolithographically, fabricated microelectrodes which when energized can be used to create multi-species biofilms. This approach was used to study the exchange of metabolites, signaling molecules (acetyl homoserine lactones) and plasmids between cells within biofilms. Work was also presented investigating the effects of spatial organisation on the penetration of biocides into biofilms.

From susceptibility and antibiotic resistance we moved swiftly on to water and drainage systems. Bill Keevil (University of Southampton) presented an overview of the models used to study a wide range of applications and highlighted the specific problems associated with these with respect to scale and applicability issues.

Andrew McBain drew the session to a close with a short presentation about modelling drain microbial ecosystems. Domestic drains are common to all households and are major sites for biofilm growth. The presence of large numbers of pseudomonads is of concern in cystic fibrosis care, whilst drains in hospitals and the food industry are well known sources of infection and contamination. Andrew showed that drain biofilms could be realistically modelled for several years using CDFPs with deep set biofilm plugs. His data indicated that sub-lethal biocide exposure (triclosan and a quaternary ammonium compound) caused shifts in community composition, but that triclosan tolerance and cross resistance to antibiotics did not occur, one reason being that nutrient rich drain biofilms were able to detoxify triclosan.

The meeting finished at 4.30pm and the delegates were invited to an informal cheese and wine reception to launch the new Biofilm Club website and logo. From general feedback received on the day and the following few days the meeting must have been enthralling! Thank you to all the Biofilm Club members for attending and contributing to the lively discussions following each presentation. We would also like to thank GSK for sponsoring the event.

David Allison and Dave Spratt

NAME:

EMAIL:

ADDRESS:

POSITION:

BIOFILM CLUB MEMBER (please circle)

YES

NO (membership

enclosed?)

I am a postgraduate student studying biofilms and have worked in the following area for less than 18 months:

COMPLETE ONE OF THE FOLLOWING

I am prepared to offer an oral presentation (c. 10 mins) to the Gregynog meeting with the title:

A brief synopsis of my proposed talk (50-100 words):

OR

The organising committee reserves the right to select appropriate topics for inclusion in the Gregynog 2005 meeting. Pre-registration will ensure that you have a high priority to attend as a delegate.

RETURN this form before January 31st 2005 to:

Dr Andrew McBain,
School of Pharmacy,
University of Manchester,
Manchester M13 9PL,
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