Dear Colleagues,

Once again we near the end of another year and how quickly this one seems to have passed. FABLS has had a very successful year and our membership both within Australia and internationally is strong and growing.

I am pleased to congratulate 26 members on their successful funding applications, the highest number of grants awarded since the first round back in 2005. It is pleasing to see that so many projects and networking opportunities, as well as future possibilities are being facilitated by FABLS. FABLS has also reached a marvellous milestone - having distributed over $1,000,000 of funding to members over the past three years, facilitating over 100 projects in the process.

It is also with pleasure that I can announce that the FABLS book is in its final stages of editing before production. The book titled ‘Fluorescence Applications in Biotechnology and Life Sciences’ showcases many of our members and their wonderful work and although it has taken a while, the finished product will be a remarkable resource for our community.

Continuing the FABLS commitment to Education and Training, a number of initiatives in this area have been realised this year, and yet more are in development. We were proud to support the Ludwig Scientific Imaging Workshop - Microscope to Publication in May 2007, as well as the APBP 2007 Conference in Cairns. We have contributed funding to a number of workshops this year and will continue to do so. For example, we are supporting a workshop on ‘Imaging Infectious Disease at the Molecular, Cellular and Tissue Level’, being held by the Walter & Eliza Hall Institute of Medical Research, together with the Institut Pasteur, early in 2008.

Hopefully you have been able to attend one of the various seminars FABLS has run this year e.g. one just recently, in conjunction with the Australian Key Centre for Microscopy & Microanalysis at the University of Sydney, presented by Sarah Russell, and earlier in July, at Macquarie University presented by David King. There is another upcoming FABLS seminar in Sydney on 6th December being presented by Mark Baker to which all are welcome and another in Melbourne shortly after. Please see the website for details.

Dates and first details for the 2008 Annual FABLS Workshop were recently announced, hosted by QUT in Brisbane next year, on the 21st-22nd February. Please check the FABLS website as we will be updating information regularly, as well as for online registration.

As always it is a pleasure to be able to contribute and collaborate with you all in the different ways that FABLS allows, especially the FABLS Committees, which this year have been active and have achieved so much. I look forward to seeing some of you at the 2nd Advanced Imaging Workshop on the 26th – 28th November at the University of Melbourne.

All the best,

Ewa Goldys
**Membership**

FABLS has experienced huge growth over the past 6 months and our network now stands at 362 members, from both the Australian and international fluorescence community. FABLS currently has 277 Australian members from 70 different research institutions or companies, along with international members from 22 countries worldwide i.e. Belgium, Canada, Cote D’Ivoire, Denmark, Finland, France, Germany, India, Italy, Ireland, Japan, Kuwait, The Netherlands, New Zealand, Pakistan, Portugal, Russia, Singapore, Spain, Taiwan, the U.S.A. and the U.K.

**Have a look at our Membership on the FABLS website...**

http://www.physics.mq.edu.au/research/fluoronet/

**See what members are doing...**

Click on Membership and read a few capability statements and project descriptions.

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**Business Liaison**

**Cooperative research centre initiative**

As reported in previously, we are setting ourselves a task to create a centre in the area of advanced cell technologies of relevance to personalized medicine and diagnostics. To build a relevant case to attract business interest, discussions at a technical level have been held with more than 20 companies. Time is required to develop these relationships.

The programs suggested for the CRC are:
- Real time multiplex detection of pathogens in a health care setting.
- Purification of cell populations.
- Cellular Biosensors

The programs will develop the following products
1. Applications of flow cytometry
2. Updated flow cytometry
3. Antibodies
4. Biosensors
5. Fluorescent proteins
6. Imaging and software

The products (in brackets) will have an application in the following industry areas.

<table>
<thead>
<tr>
<th>Market sectors</th>
<th>Possible CRC products</th>
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<tbody>
<tr>
<td>Personalised therapy tools (1)</td>
<td>Cell sorting kits&lt;br&gt;- stem cells, cancer cells, sperm</td>
</tr>
<tr>
<td>Food production (1 &amp; 3)</td>
<td>Kits for pathogen detection&lt;br&gt;- non cultural, real time techniques</td>
</tr>
<tr>
<td>Pharmaceuticals (4)</td>
<td>Assessment of drug efficacy&lt;br&gt;- quality control (national testing lab)</td>
</tr>
<tr>
<td>Diagnostics and bioprotection (1 &amp; 3 &amp; 6)</td>
<td>Low cost multiplex assays&lt;br&gt;- eg improved management of disease causing microbes</td>
</tr>
<tr>
<td>Biosecurity and border protection (1 &amp; 3)</td>
<td>Rapid detection of hazards&lt;br&gt;- eg foot and mouth</td>
</tr>
<tr>
<td>Environment (1 &amp; 3 &amp; 4)</td>
<td>Improved methods of assessment&lt;br&gt;- eg Cryptosporidium, Giardia</td>
</tr>
<tr>
<td>R&amp;D (1 &amp; 2 &amp; 3 &amp; 4 &amp; 5 &amp; 6)</td>
<td>Next generation products&lt;br&gt;- biosensors, transgenic animals&lt;br&gt;- improved instruments, reagents and software</td>
</tr>
</tbody>
</table>
A number of review articles are presented below. The articles are brief version of the one-page project descriptions provided by the researchers. All the researchers (contact details provided) are interested to discuss applications of their technology with commercial partners and interested academics.

**Time Gated Flow Cytometry - A new rapid counting of cell pathogens by a simplified flow cytometry system**

This technology is near ready for commercialisation. Flow Cytometry is a process in which scattering or fluorescence measurements are made of cells or particles as they pass, preferably in single file, through a measuring apparatus in a fluid stream. Flow cytometers identify and enumerate specified cells at rate of 1000 to 40,000 cells per second continuously.

An inexpensive LED excited time gated flow cytometer was developed allowing for accurate and rapid counting of specified micro-organisms, like water pathogens, blood lymphocyte CD4/CD8 ratios for HIV monitoring, or bacteria. The invention combines the rapid counting capabilities of flow cytometry, compact solid-state UV LED excitation and the high signal to noise detection capabilities of the time-gated luminescence technique.

The relatively inexpensive componentry used in this flow cytometer makes it suitable for point of care applications in pathology and pathogen detection in the food and water industry. The time gated luminescence platform used in this flow cytometer enables a high signal to noise ratio to be maintained for highly auto-fluorescent samples such as sputum, faeces and water samples.

This invention will benefit HIV patients, blood testing, public water testing applications and the following industries: beverage, milk, food processing (quality controls in real-time), pharmaceutical and cosmetics.

Key benefits of the invention are low cost, high sensitivity, Potential portability and simplified rapid cell counting.

This invention has a patent filed in Australia.

**Homogeneous Silver-Coated Nanoparticles and their Application for Fluorescence Enhancement**

Metal nanostructures have been shown to enhance fluorescence, in a process resembling Surface Enhanced Raman Effect. Our work (goldys@ics.mq.edu.au) focuses on using such nanostructures for producing large scale homogeneous fluorescence enhancing flat surfaces and other media such as porous membranes. These will find applicability as an aid in fluorescence diagnostics in various areas of biotechnology and life sciences.

A simple method has been developed for the deposition of uniform silver-coated nanoparticles on glass substrates, with a homogeneous distribution. The nanoparticles have been shown to enhance fluorescence by a factor of about 10.

Collaboration is sought to extend this study to bioassays and other diagnostic technologies. Results for new bioassays are achievable reasonably quickly, possibly within six months. Progress with other diagnostic technologies will depend on the complexity of their requirements.
Identification and subsequent elimination of cellular roadblocks limiting protein secretion in a fungal cell factory

Production of recombinant proteins of plant and animal origin in the promising eukaryotic cell factory of *Trichoderma reesei*, a filamentous fungus, is being studied by Michal M Godlewski (mgodlews@chem.mq.edu.au) at Macquarie University. Identification and elimination of inhibiting checkpoints is essential to employ the fungal cell for the synthesis of proteins of industrial and pharmaceutical importance.

The aim of the project is to visualise and characterise the secretory pathway in *Trichoderma reesei* based on the efficiently secreted native CBH-I enzyme coupled with fluorescent protein. Based on the result, check-points preventing efflux of foreign proteins will be identified. Finally, identified check-points in secretory pathway will be eliminated by the means of genetic engineering.

Primary research tools being employed are confocal laser scanning microscopy, *in-vivo* scanning cytometry, and quantitative analysis of fluorescent image.

Recent projects: molecular mechanism of action of anti-cancer drugs, molecular mechanism of programmed cell death in the enterocyte; processes involved in maintaining the dynamic equilibrium between proliferation and cell death in the complex tissue of intestinal mucosa; cell interactions with various titanium-based alloys in transplantology; pathogen-induced (virus and bacteria) changes in the cell cytoskeleton; characterization of the luminescence properties of newly developed semiconductors.

Conferences and Courses

21 - 22 February 2008
FABLS Annual Workshop 2008, Queensland University of Technology

The 2008 FABLS Workshop will be held in Brisbane, hosted by FABLS members, at the Queensland University of Technology. The workshop will be held in the at the Institute of Molecular Bioscience (IMB) Auditorium. Speakers confirmed thus far are:

1. Alpha Yap (Associate professor IMB, University of Queensland)  
2. Jenny Stow (Professor, IMB, University of Queensland)  
3. Elliot Botvinick (Assistant Professor, Beckman laser Institute, USA)  
4. Matt Trau (Professor IMB, University of Queensland)

The 2008 workshop will be held over 2 days; the extended format allowing for more detailed discussions, including those of the future of FABLS beyond 2009.

There will also be a poster session and we encourage everybody, including our Company Members and postgraduate students to submit a poster. Poster dimensions and submission dates will be available shortly.

Please see the FABLS website for Online Registration and for updated information as it is confirmed: [http://www.physics.mq.edu.au/research/fluoronet/FABLSWorkshop2008.html](http://www.physics.mq.edu.au/research/fluoronet/FABLSWorkshop2008.html)

31 January – 1 February 2008
Imaging Infectious Disease at the Molecular, Cellular and Tissue Level

This workshop, being held by the Walter & Eliza Hall Institute of Medical Research, together with the Institut Pasteur, will bring together French and Australian scientists and provide a relaxed and informal forum for the exchange of data and ideas on the exploitation of state of the art imaging technologies to the elucidation of host-pathogen interactions in different infectious diseases from bacteria to parasites.
Topics include cell invasion by bacteria and protozoan parasites, microbial cell-cell interactions, intracellular trafficking and the use of imaging techniques to screen for new drugs. New and evolving technologies include molecular beacons and quantum dots, cryo-electron microscopy and dynamic imaging of cells and tissues.

Enquiries: Email: enquiries-pasteur2008@wehi.edu.au
Registration at: http://www.wehi.edu.au/pasteurworkshop

**Projects recently supported by FABLS**

**FABLS Funding**

Over the 3 years since the inception of the Network, FABLS has been able to distribute over $1,051,000 to the Australian Fluorescence research community. FABLS has provided many opportunities for scientific collaboration and seed project development, facilitating over 100 projects, involving well established, as well as Early Career, and student researchers, both from within Australia and worldwide.

The latest funding round, i.e. Round 2, 2007, saw the largest pool of applications for funding since 2005, and FABLS was pleased to be able to support 26 projects.

Our Congratulations to the successful applicants, whose names and project titles follow:

<table>
<thead>
<tr>
<th>Chief Investigator</th>
<th>Project title</th>
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<tbody>
<tr>
<td>Ron Clarke</td>
<td>Binding of fluorescently-labelled ATP derivatives to the sodium pump</td>
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<tr>
<td>Pierre Moens</td>
<td>Raster scan Image Correlation Spectroscopy in Giant Unilamellar vesicles</td>
</tr>
<tr>
<td>Leann Tilley</td>
<td>Characterisation of novel red fluorescent proteins to study protein trafficking in malaria parasite-infected erythrocytes</td>
</tr>
<tr>
<td>Riccardo Cicchi</td>
<td>Metabolic imaging of diseased human skin</td>
</tr>
<tr>
<td>Louise Brown</td>
<td>FRET-ing over CLIC insertion</td>
</tr>
<tr>
<td>Ken Ghiggino</td>
<td>Development of “Upconversion” Fluorescence Probes for Life Science Applications</td>
</tr>
<tr>
<td>Morry Silberstein</td>
<td>In vivo Fluorescent Imaging of the Cutaneous C-Fiber Afferent Nervous System</td>
</tr>
<tr>
<td>Liz Harry</td>
<td>Bacterial cell biology: Investigating an optical revolution</td>
</tr>
<tr>
<td>Xiaotao Hao</td>
<td>Fluorescence imaging of aligned macromolecular systems</td>
</tr>
<tr>
<td>Heath Ecroyd</td>
<td>Investigations into the anti-amyloid properties of curcumin using fluorescence-based spectroscopy</td>
</tr>
<tr>
<td>James Rabeau</td>
<td>Nanodiamond based biomarkers</td>
</tr>
<tr>
<td>Hemant Bhatta</td>
<td>Fluorescence Correlation Spectroscopy (FCS) to study the diffusion through diatoms and other biological membrane</td>
</tr>
<tr>
<td>Kristina Youngs</td>
<td>Imaging organelle autophagy yeast at super resolution in real-time</td>
</tr>
<tr>
<td>Tak Kee</td>
<td>Visualising Differentiation of Adult Stem Cells using Nonlinear Microscopy</td>
</tr>
<tr>
<td>Phil Wearne</td>
<td>Fluorescence spectroscopy and mass spectrometry of biomolecules and nanoparticles</td>
</tr>
<tr>
<td>Robert Richardson-Bryson</td>
<td>Improvements in Optical Projection Tomography Reconstructions</td>
</tr>
<tr>
<td>Craig Priest</td>
<td>Online capsule formation by consecutive adsorption of fluorescent polyelectrolyte in a microfluidic network</td>
</tr>
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</table>

FABLS Website - www.physics.mq.edu.au/research/fluoronet
FABLS Book

As previously mentioned the FABLS book is in its final stages of editing prior to production and is expected to be published and available in 2008. This book, titled “Fluorescence Applications to Biotechnology and Life Sciences”, showcases many FABLS’ members and their wonderful work and although it has taken a while, the finished product will be a remarkable resource for our community. More information will be available in the next Newsletter.

Young Fluorescence Investigator Award

Nominations are now being accepted for the Young Fluorescence Investigator Award sponsored by the Biological Fluorescence Subgroup of the Biophysical Society and Horiba Jobin Yvon, Inc.

Selection for this award is based on novel applications of fluorescence spectroscopy to current work in biology and biophysics by a pre-tenure faculty member. The awardee receives a cash prize of $1000 and will present a lecture on her/his research at the Annual Biophysical Society Meeting to be held on February 2 - 6, 2008, Long Beach, California.

Awarded Nominations should be addressed to:

Dr. David M. Jameson
Dept. Cell and Molecular Biology
University of Hawaii
651 Ilalo St. BSB 222
Honolulu, Hawaii  96813, USA
Email: djameson@hawaii.edu
Ph: 808-956-8332

Send a letter of nomination explaining how the candidate's work represents novel and exciting applications of fluorescence to biology and biophysics. Include the candidate's CV, a reprint or preprint that exemplifies the candidate's exemplary contribution and three letters of support. Nominations will be accepted through Friday, December 14, 2007. Application materials may be sent electronically (via email and pdf files) to djameson@hawaii.edu.
The Gregorio Weber International Prize in Biological Fluorescence (Weber Prize) is awarded for research related to a doctoral (or equivalent) dissertation. All fields of biological fluorescence (experimental, theoretical, or applied) are eligible. The award is conferred approximately every three years and is presented at a selected international scientific meeting. The award is international in scope. Submitted dissertations will be evaluated by a scientific panel and three finalists will be identified. A second panel will select the winner from the three finalists. Weber Prizes were awarded in 2002 and 2005. The third Weber Prize will be awarded in 2008. The winner of the 2008 Weber Prize will receive a cash award of $2,500 and an invitation to present an acceptance lecture at the Weber Symposium in Hawaii, where the award will be presented: (http://www.lfd.uci.edu/weber/symposium). The remaining two finalists will receive honourable mention awards of $1,000 each, and will also be invited to the Weber Symposium.

Award Requirements 2008

- The dissertation must have been accepted and the doctorate conferred during the three years prior to December 14, 2007.
- English is the preferred language. Dissertations not in English must include a 10-15-page summary in English.
- A maximum of two first (or last) author published manuscripts, arising from the dissertation research, must also be provided. Manuscripts not in English must have an English translation appended.
- Materials should be submitted in digital format (preferably in PDF) via the Registration page (http://www.lfd.uci.edu/weber/prize).
- Deadline for submission is December 14, 2007.

Your Contributions to the Newsletter

We would like the readers to also be the editorial providers, so have your say, or contribute information that other members may want to hear about. Some of the sorts of things we would like to include are:

- interesting contacts (we need to build our national database);
- equipment available for collaborative (and consultative) projects;
- latest equipment updates from industry;
- 'good news stories'.

Compiled by David Tayler
dtayler@ics.mq.edu.au