



**Australian Society for Biochemistry and
Molecular Biology, Inc**

**HODs and Education Representatives Meeting
2007**

***DEVELOPMENTS AND CHALLENGES IN
EDUCATION IN BIOCHEMISTRY AND
MOLECULAR BIOLOGY IN AUSTRALIA***

Lecture Theatre L4

**Building 12, Clayton Campus,
Monash University**

10 December 2007

PROGRAM AND ABSTRACTS

This meeting is hosted by:

**Department of Biochemistry and Molecular Biology
Monash University**

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Organisers

Phillip Nagley

Martin Stone

**Department of Biochemistry and Molecular Biology
Monash University**

Program

| | |
|---------------------|---|
| 8.15 - 8.45 am | Registration |
| 8.45 - 9.00 am | Welcome and Introduction: Phillip Nagley (<i>Monash</i>) |
| 9.00 - 10.00 am | The Concept Inventory Chair: Irene Stanley (<i>Univ Melbourne</i>) Keynote speaker: Susan Hamilton (<i>UQ</i>) |
| 10.00 - 10.25 am | Morning tea break |
| 10.25 am - 12.30 pm | Quality and Effectiveness in the Broad Educational Frameworks for Education linked to Biochemistry and Molecular Biology Moderator: Trevor Anderson (<i>South Africa</i>) Position statement from session convenor: Liz Johnson (<i>La Trobe</i>) (10 min) Breakout sessions: (45 min) [<i>see next page</i>] <ul style="list-style-type: none"> • Education and training centred on Biochemistry and Molecular Biology • Service teaching at tertiary and postgraduate levels where BMB has input but is not the major theme • General education and awareness of science in primary and secondary schools and the wider community – possible new fronts for BMB inputs Reports from spokespersons of each breakout group: (45 min) Summation and action plans: Trevor Anderson and Liz Johnson (25 min) |
| 12.30 – 1.30 pm | Lunch |
| 1.30 – 3.00 pm | Functional Networks for Biochemistry and Molecular Biology in Australia Chair: Paul Attwood (<i>UWA</i>) Developing a National Electronic Resource for Education in Biochemistry and Molecular Biology Charlotte Brack (<i>Monash</i>) (45 min) The ASBMB Education Special Interest Group Susan Howitt (<i>ANU</i>) (45 min) (including open forum on the development of the SIG) |
| 3.00 to 3.30 pm | Afternoon tea break |
| 3.30 - 5.00 pm | Best Practice in Education in Biochemistry and Molecular Biology Co-Chairs: Enzo Palombo (<i>Swinburne</i>) and Martin Stone (<i>Monash</i>) Selected presentations (each 10 min plus 5 min discussion) [<i>see next page</i>] |
| 5.00 to 5.30 pm | Closing session Chair: Nick Hoogenraad (<i>La Trobe</i>) Recruitment and Retention in Biochemistry and Molecular Biology Denis Crane (<i>Griffith</i>) Closing remarks Rob Pike (<i>Monash</i>) |
| 6.30 for 7.00 pm | Drinks followed by dinner in Heritage Hall, Bruce County Motor Inn 445 Blackburn Road, Mount Waverley (Melway ref: H5) |

Program

10.25 am - 12.30 pm

Breakout sessions:

Meeting participants will be divided up into four groups, to meet in rooms:

| | |
|---------|-----|
| Group A | G04 |
| Group B | G05 |
| Group C | G06 |
| Group D | G08 |

All rooms are all near to Lecture Theatre L4 on the same level of Bldg 12

Group assignment is indicated on attendance list on pages 24 and 25.

Other information about the breakout session will be available in the Foyer of L4

3.30 - 5.00 pm. Best Practice in Education in Biochemistry and Molecular Biology

Co-Chairs: Enzo Palombo (Swinburne) and Martin Stone (Monash)

3.30 **Brett Lidbury** and Felicia Zhang (University of Canberra)
Teaching Molecular Biology as a Foreign Language

3.45 **Gareth Denyer** (University of Sydney)
Biochemistry 2: The Directors Commentary

4.00 **Phillip Dickson** (University of Newcastle)
Analysis of a Published Scientific Article

4.15 **Janet Macaulay** and Karen Walker (Monash University, Clayton)
Contextual Teaching of Nutritional Biochemistry

4.30 **Jenny Mosse** and Wendy Wright (Monash University, Gippsland)
Acquisition of Laboratory Skills by On-Campus and Distance Education Students

4.45 Charlotte Brack and **Marie-Paule Van Damme** (Monash University, Clayton)
Collaborative Learning Online: Integrating Media in Case-Based Learning for Practical Biochemistry

Program

Best Practice in Education in Biochemistry and Molecular Biology

Contributions presented as abstracts

1. **Ulrike Kappler** (University of Queensland)
Threshold Concepts in Biochemistry – Teaching Enzyme Kinetics to Undergraduates
2. **Enzo Palombo** and Soula Mougos (Swinburne University)
The Fundamentals – Introducing Students to Basic Biochemical Laboratory Procedures
3. Paul Haynes and **Tom Roberts** (Macquarie University)
Functional Proteomics at the (Gel) Cutting Edge: a 5-day lab class
4. **Martin Stone** (Monash University)
Design and Implementation of a Coursework Curriculum for Biochemistry Ph.D. Students at Indiana University
5. **Barbara van Leeuwen** (Australian National University)
Innovative Approaches to Teaching Ethical, Regulatory and Legal Issues to Biotechnology Students

Abstracts and Presenter Profiles

Susan Hamilton

Development of a concept inventory for the molecular life sciences

Susan Hamilton¹, Tony Wright¹, Susan Howitt², Trevor Anderson³, Manuel Costa⁴

¹The University of Queensland, Brisbane, ²Australian National University, Canberra,

³University of KwaZulu-Natal, South Africa ⁴University of Oporto, Portugal

This project is targeting student learning of the molecular life sciences by developing a tool for educators to research their teaching. We are developing:

- a set of clearly articulated key concepts which underpin the molecular Life Sciences.
- a validated web-based assessment tool (the Concept Inventory) that tests these concepts.

The first phase of the project involves the identification of a set of “Big Ideas” which are unique to the molecular life sciences and which capture, in a comprehensive and future-looking way, thinking by experts in the field. These Big Ideas will serve as a theoretical framework for the remainder of the project.

The second phase will be the identification of key concepts which underpin understanding of these “Big Ideas”, and which are at an appropriate level of discreteness and specificity to be tested.

The third step will be the development of a test which can be used to make judgments of student understanding of selected key concepts.

The final step will be the rigorous evaluation of the test for reliability and validity.

We are looking at this initial stage for your comments, as experts in the field, on the appropriateness of our initial list of big ideas.

Speaker Profile

Susan Hamilton has a wide range of activities in teaching, research and administration.

Present position: Professor of Biochemistry and Deputy President Academic Board, UQ

2000-2006: Director of Studies, Faculty of Biological and Chemical Sciences, UQ

Prior to 2000: Teaching and research academic: Department of Biochemistry, UQ

Research interests: Structure, function and mechanism of enzymes; Women in science

Teaching interests: Peer assisted learning; Programs for very able students;

Quality in assessment; Curriculum development for the future

Susan is Chair of the IUBMB Committee on Education in Biochemistry and Molecular Biology and a member of the IUBMB Executive Committee.

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Abstracts and Presenter Profiles

Liz Johnson

Quality and Effectiveness in Biochemistry and Molecular Biology Education

Convenor: Dr. Liz Johnson

Department of Biochemistry, La Trobe University, Melbourne

Biochemistry and Molecular Biology educators teach into a broad group of science and professional courses and contribute to outreach programs in schools and the community. They also train future researchers and professionals working in biochemistry and molecular biology. Universities are facing major challenges to maintain and improve enrolments in science, to meet targets for excellence in education and at the same time manage scarce resources. The workshop looks at potential roles for ASBMB in promoting and supporting education in its discipline..

Profile

Liz Johnson is Senior Lecturer in the Department of Biochemistry at La Trobe University. She teaches introductory and advanced Biochemistry and Molecular Biology to undergraduates in general and applied bioscience courses. In 2006, Liz was awarded citations for outstanding contribution to teaching by La Trobe University and by the Carrick Institute. In 2007 Liz was awarded the Invitrogen Education Award by ASBMB for her work in curriculum design and enquiry-based learning.

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Abstracts and Presenter Profiles

Trevor Anderson

Quality and Effectiveness in Biochemistry and Molecular Biology Education

Moderator: Trevor Anderson

University of KwaZulu-Natal, South Africa

Profile

Present Positions:

- Head, Science Education Research Group (SERG)
- Associate Professor in Biochemistry
- Member: IUBMB Educational Sub-Committee
- Member: Editorial Board of “Biochemistry & Molecular Biology Education”
- Author: ‘Bridging the Gap’ Column in “Biochemistry & Molecular Biology Education”
- Member: IUBMB/ Australian Carrick Concept Inventory Projects

Research/Teaching Interests:

- Assessment of students’ conceptual understanding and visual literacy
- Identification and remediation of conceptual and visualization difficulties
- Design and use of models- diagrams, computer images and animations
- 33 years of teaching experience in biochemistry, science education and ethics
- Strongly believes in the ‘power’ of cross-disciplinary interaction in teaching and research.

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Abstracts and Presenter Profiles

Charlotte Brack

Developing a National Electronic Resource for Education in Biochemistry and Molecular Biology

Charlotte Brack

Educational design and e-learning unit, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne

What might a national electronic resource for education look like? Why do we need it? What's out there already? What are the models and their pros and cons? What's a good model for us? Who do we need to make it happen and how do we get it going? The development of Web 2.0 technologies has opened up possibilities for networking and collaborating online. Consequently online 'communities of practice' have proliferated, however, their success depends more on a need to share concerns and interact, than on capacities of technologies. An online 'community of practice' based on the domain of electronic resources for education, could serve a community of educators sharing in the practice of teaching. It might include the collaborative environment of a wiki interfaced with existing resources. With increasing potential of the technologies understanding the need for such a community is crucial to its design and success.

Speaker Profile

Charlotte Brack has an academic background in Biochemistry. She pursued research and teaching in the discipline and became increasingly interested in the challenges and theories of teaching and learning. She developed early computer-facilitated modules for teaching molecular mechanisms, moving to problem-based and online methods within the discipline. Ongoing activities include integration of materials in educational environments; innovation in the use of new technologies; evaluation of materials and environments; professional development for university staff.

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Abstracts and Presenter Profiles

Susan Howitt

The ASBMB Education Special Interest Group

Susan Howitt

School of Biochemistry and Molecular Biology, Australian National University, Canberra

I would like to see the Education SIG playing a more active role by becoming more relevant to ASBMB members. The SIG, with the proposed website, has the potential to act as a focus for the community of educators in biochemistry and molecular biology. While we all accept that discussing our scientific research and presenting it at conferences is valuable, this is equally true for our teaching strategies and philosophies but is done much less frequently. The website could involve provision of resources, a forum for discussion of teaching and learning issues and perhaps also some advice and resources for those wanting to adopt a more scholarly approach to their teaching, including research into teaching. The SIG will continue to play a role in organising workshops and symposia within the framework of ComBio. Other workshops could be arranged if there was interest and support from members.

Speaker Profile

Susan Howitt spent a number of years in a research-only position, leading to her current research on the structure and function of transporters. She has had her current teaching/research position since 1997. She became concerned about the mismatch between what most of us want and expect from our students and what they actually achieve, and became interested in the theory and scholarship of teaching and learning. Educational research is now a significant research interest for her and she is completing a Master of Higher Education.

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Abstracts and Presenter Profiles

Denis Crane

Recruitment and Retention into Biochemistry and Molecular Biology

Denis Crane

School of Biomolecular and Physical Sciences, Griffith University, Brisbane

This presentation represents an ASBMB perspective on the development of a greater role of the society in learning and teaching in biochemistry and molecular biology, and builds on the initiatives presented at this meeting. An increasing emphasis on education in ASBMB reflects a shift in ASBMB activity. This new initiative should be viewed from a background of declining ASBMB ordinary and student membership, and an increasing number of competing research societies and small interest groups. It therefore raises the broader issue of how the society can best serve student members, practicing biochemists/molecular biologists, and university departments. A corollary is how university departments can play a more active role in ASBMB to enhance recruitment and retention of ASBMB members at all levels, and to cater for both research and learning/teaching interests.

Speaker Profile

Denis Crane is currently President of ASBMB and Deputy Head of the School of Biomolecular and Physical Sciences. In 2006 he was Head of the School of Biomolecular and Biomedical Sciences. His teaching and research interests are in molecular cell biology. He has held roles as convenor of the Griffith Biomedical Science and Medical Science programs. Current research is focused on the mechanisms underpinning neurodegeneration in the peroxisomal disorders and associated diseases.

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Abstracts of Best Practice Presentations

Brett Lidbury

Teaching Molecular Biology as a Foreign Language

Brett A. Lidbury¹ and Felicia Z. Zhang²

¹School of Health Sciences, and ²School of Language & International Studies,
The University of Canberra

An observed barrier to student learning of molecular biology was difficulty with the language of the discipline; this problem blocked student engagement with concepts and knowledge in their molecular biology subject.

The aim of this study was to investigate whether learning molecular biology subject content was assisted by the application of educational techniques normally found in language learning (e.g. Mandarin Chinese). To determine the value of this teaching style, quantitative and qualitative analyses were performed to compare a language cohort with earlier student cohorts who studied under traditional transmissive modes of delivery. Qualitative analysis showed that students found group work beneficial and that the language skills acquired were transferred to other subjects. Quantitative analysis revealed that while no significant overall improvement for the language cohort was found, Distinction level students gained most benefit from exposure to language centred teaching methods.

Presenter Profile

Brett Lidbury is a Senior Lecturer with Health Sciences, the University of Canberra. Over the previous 10 years he has developed, coordinated and taught molecular biology, genetics and the biochemistry of disease. Research interests are in the molecular pathogenesis and immunobiology of virus infection, particularly involving the viral subversion of immune/inflammatory responses by the alteration of host gene expression. Over the last 3-years, a research interest has developed in the application of language pedagogy to science education.

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Abstracts of Best Practice Presentations

Gareth Denyer

Biochemistry 2: The Directors Commentary

Gareth Denyer

School of Molecular and Microbial Biosciences, University of Sydney

I have used Articulate Presenter for several years to create narrated, online lecture presentations and dynamic analyses of past-paper questions. Recently I have experimented with a new presentation style - running the audio content as a free-ranging discussion with colleagues, reworking the Socratic dialogue in the style of the "Directors Commentaries" on modern DVDs. The final products are exceptionally popular with the students as they capture all that is good about interactive chalk-n-talk style presentations in a flexible, electronic form. The modules also provide opportunities to foster critical thinking skills and to show the students how we Biochemists approach problems.

Presenter Profile

Gareth Denyer has been a lecturer in Biochemistry, Molecular Biology and Nutrition for 18 years. He won the 1995 University of Sydney Teaching Excellence Award and was the University's nominee for the inaugural National Teaching Awards. He was chair of the ASBMB Education Special Interest group for 3 years.. He coordinates and teaches in courses at all levels at the University. He is interested in anything that stimulates student interest and understanding of Biochemistry. He has a love-hate relationship with PowerPoint.

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Abstracts of Best Practice Presentations

Phil Dickson

Analysis of a Published Scientific Article

Phillip Dickson

Discipline of Medical Biochemistry, School of Biomedical Sciences, University of Newcastle

Aim: to introduce students to research articles and to develop in the students the capacity to critically interpret research articles.

Student Group: Biomedical Sciences second year/first semester

The students had just completed a Cell Signalling module in which they were introduced to concepts of signalling pathways and protein phosphorylation/dephosphorylation. The students had also just completed a practical in this module in which they done western blotting and measured total ERK and phospho-ERK. The paper chosen used Western blotting as the primary means of analysis and amongst the targets for analysis was ERK and phospho-ERK. The students were initially given the paper for them to examine. This was the first time the students had examined a scientific article in detail. I therefore carried out an interactive whole class tutorial to provide guidance to students on how they should analyse the paper.

Three days after the tutorial the students were given a 2-hour exam on the paper. This was an open book exam so that it was testing the student's understanding of the paper and not their ability to memorise it.

Presenter Profile

Phil Dickson is a senior lecturer in the discipline of medical biochemistry. His primary teaching areas are molecular biology, cell signalling and enzymology. His research has focused on the enzyme tyrosine hydroxylase, the rate limiting enzyme in the biosynthesis of the catecholamines dopamine, noradrenaline and adrenaline. The specific area of his research has been on the role of phosphorylation in controlling tyrosine hydroxylase activity.

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Abstracts of Best Practice Presentations

Janet Macaulay

Contextual Teaching of Nutritional Biochemistry

Janet Macaulay¹ and Karen Walker²

¹Department of Biochemistry and Molecular Biology, and ²Department of Medicine (Monash Medical Centre), Monash University, Melbourne

Nutritional Biochemistry is a broad and complex discipline, taught to Dietetics students, requiring the integration of a range of concepts. Learning in a case based clinical context enables students to see its relevance and importance to their profession.

Students are required to access cases online, research and prepare answers to a number of questions before face-to-face tutorials. Students discuss their answers in the tutorials with a clinical dietician and a biochemist. After the tutorials, detailed answers and discussion are posted online allowing for individual student revision and exam preparation. In addition, self-review multiple choice questions relating to the case and to the review material are also posted for student self-assessment.

The integrated case studies enable application of biochemical knowledge to relevant situations, enhancement and integration of content knowledge, revision, active learning, development of critical thinking and problem solving and stimulation of student interest and self-directed learning.

Presenter Profile

Janet Macaulay is Lecturer, Department of Biochemistry and Molecular Biology, with a focus on education. She is involved extensively in the development of teaching/learning materials, course development and delivery in science, biomedical and medical education. She has a strong interest in research into the scholarship of teaching and learning – in particular the effect of assessment practices on students' learning and the value of laboratory-based practical sessions in teaching Biochemistry

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Abstracts of Best Practice Presentations

Jenny Mosse

Acquisition of Laboratory Skills by On-Campus and Distance Education Students

Jenny Mosse and Wendy Wright

School of Applied Sciences and Engineering, Monash University, Churchill, Victoria

The School of Applied Sciences and Engineering (SASE) at the Gippsland Campus of Monash University has extensive experience in teaching experimental science programs by distance education. Subject areas offered to distant students include biochemistry, cell biology and microbiology. Distance education students meet the laboratory requirements of these subjects using home laboratory kits, performing computer simulations and by attending residential schools.

The diversity of the on-campus and off-campus student populations, and the variety of modes in which the practical/laboratory components of the units are delivered, raise the question of parity of experience for students in the distance education and on campus cohorts. It is essential that both on-campus and off-campus students acquire the skills and competencies required in the workplace or for higher level studies. This study compares the experiences of students in both cohorts at all year levels.

Presenter Profile

Jenny Mosse has been Senior Lecturer at Monash University since 1999. Before that she was lecturer at Gippsland Institute of Advanced Education Monash University since 1990. Her teaching interests include the development of innovative methods for flexible delivery of science programs to remote students. Her current research projects include work on anti-sense transcription in HIV-1 and investigation of the pathogenicity and infectivity of influenza viruses

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Abstracts of Best Practice Presentations

Marie-Paule Van Damme

Collaborative Learning Online: Integrating Media in Case-based Learning for Practical Biochemistry

Charlotte Brack¹ and Marie-Paule Van Damme²

¹Educational Design and e-Learning, Faculty of Medicine, Nursing and Health Science, and

²Department of Biochemistry and Molecular Biology, Monash University, Melbourne,

It has become increasingly difficult to expose students to various techniques, procedures and laboratory equipment used in Biochemistry due to increased student numbers and limited facilities for practical classes. We have developed a collaborative, student-centred, online case-based program “What’s wrong with Elisa” for learning basic principles of practical biochemistry such as spectrophotometry, determination of sample concentration, immunoassays... The program incorporates a website presenting the case and online group work using Wikis. Elisa’s Blog guides students in their exploration of the case. Resources describe biochemical tests and procedures using text, images and video. Wikis generated by student groups were assessed and collaboration evaluated using discussion and history functions. Students contributed to the assessment by voting for the best Wiki. Evaluation of the program by survey and focus group showed that it enhanced motivation, critical thinking and problem-solving and provided an efficient, effective and enjoyable way for students to collaborate off campus.

Presenter Profile

Marie-Paule van Damme teaches Biochemistry to students from a variety of backgrounds with differing aspirations (namely, medical, biomedical and science students). To engage students in their learning and move towards “student-centred learning” she has been highly involved in innovative teaching techniques. She was at the forefront in introducing case studies, self-directed learning, and the highly successful "tutorless tutorials". She has developed a series of computer programs and on-line collaborative programs.

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Abstracts of Best Practice Presentations

Ulrike Kappler

Threshold Concepts in Biochemistry –Teaching Enzyme Kinetics to Undergraduates

Ulrike Kappler

School of Molecular & Microbial Sciences, The University of Queensland, Brisbane

Every discipline contains concepts that will challenge students' views of the subject, and that, when mastered, will lead to a significant advancement of the students' understanding. In biochemistry, enzyme kinetics clearly belongs to these so called 'threshold concept'.

Although it is a traditional area of biochemistry, enzyme kinetics continues to be of great importance and informs a variety of other subjects such as molecular biology and biotechnology. At the same time, enzyme kinetics as a subject in coursework is notoriously unpopular with students, being perceived as difficult, boring and irrelevant – a view that often only changes much later in the students' career, when they finally recognize the limitations imposed by not understanding basic enzyme kinetics.

An enzyme kinetics component for a second year biochemistry course has been developed with a view to allow an inquiry based approach to the enzyme properties including the design of experiments for a wet-lab practical.

Profile

Ulrike Kappler is a lecturer in Biochemistry and Molecular Biology at the University of Queensland and has recently completed a Graduate Certificate in Higher Education. She is particularly interested in exploring teaching techniques that promote active learning in the classroom such as the use of group activities, problem solving exercises and in class demonstrations.

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Abstracts of Best Practice Presentations

Enzo Palombo

The Fundamentals – Introducing Students to Basic Biochemical Laboratory Procedures

Enzo Palombo and Soula Mougos

Faculty of Life and Social Sciences, Swinburne University of Technology, Hawthorn, Melbourne

Biochemistry subjects are taught as part of a number of courses at Swinburne University and are taken by a variety of students at undergraduate and postgraduate (coursework) levels. To ensure that all students have a sound knowledge of the fundamental principles of the biochemistry laboratory, we have introduced a practical class in which students become familiar with a number of basic techniques. The practical class involves an introduction to the correct use of a micropipette and numerical exercises using chemical and biochemical equations. Because of the numerous entry points (including regular and mid-year intakes and students articulating from TAFE) and with some students taking subjects out of sequence, students may undertake this laboratory exercise twice in their program. In fact, students benefit from the opportunity to revisit these basic and important techniques, and feel more confident when undertaking more complicated procedures, especially those required in final year project-based subjects.

Profile

Enzo Palombo is a Senior Lecturer in Microbial Biotechnology and the Director of the Environment and Biotechnology Centre. He has been involved in microbiology research for more than 15 years in gastrointestinal pathogens detection of novel viruses and other gastrointestinal pathogens, the isolation of bacteria from food, water and the environment and the identification of bioactive compounds from medicinal plants. He has undertaken contract research for industry clients which have involved various microbiological applications

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Abstracts of Best Practice Presentations

Paul Haynes

Functional Proteomics at the (Gel) Cutting Edge: a 5-day Lab Class

Paul A. Haynes^{1,2} and Thomas H. Roberts¹

¹Department of Chemistry & Biomolecular Sciences, and ²Australian Proteome Analysis Facility, Macquarie University, Sydney

We present a functional proteomics 5-day laboratory class. Masters-in-Biotechnology students compare a 2D gel-based approach with cutting-edge shotgun proteomics. We discuss setting up the class, performing the experiments, the intended outputs, and show examples of excellence in data analysis from student reports.

Profile

Paul A. Haynes is Associate Professor and Leader of Plant Proteomics at the Australian Proteome Analysis Facility (APAF). Research/teaching interests: applying protein identification and characterization by mass spectrometry to solving problems in biology. Current major project is aimed at identification and functional characterization of expressed orphan proteins in rice, particularly those that are found to be altered in expression levels in response to abiotic stress. Teaches M. Biotech.-level Functional Proteomics.

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Abstracts of Best Practice Presentations

Martin Stone

Design and Implementation of a Coursework Curriculum for Biochemistry Ph.D. Students at Indiana University

Martin J. Stone

Department of Biochemistry and Molecular Biology, Monash University, Melbourne

In the U.S.A., the broad knowledge base developed during undergraduate degrees is generally supplemented by required coursework during Ph.D. study. I will describe the recent development of a Ph.D. coursework curriculum for Indiana University's Interdisciplinary Program in Biochemistry. Required "core" courses were designed to: (1) transition students from diverse undergraduate backgrounds to the minimum required level of knowledge for Ph.D. research; (2) provide the fundamental understanding of cellular, physical, and mechanistic biochemistry needed by essentially all biochemistry researchers; and (3) develop skills in critical analysis of scientific literature and scientific writing. The curriculum also includes a series of short, elective courses covering specialized topics, with the goal of developing deeper understanding and knowledge in areas close to the students' research interests. The new curriculum has been successfully implemented over the past five years, with a total of about 40 students in the Program.

Profile

Martin Stone was Assistant Professor (1995-2002) then Associate Professor (2002-2007) in the Department of Chemistry and Biochemistry Program at Indiana University, Bloomington, IN, USA. He took up his position as Associate Professor at Monash University in mid- 2007. Research interests span the areas of protein structure, dynamics, and engineering with a particular focus on the interactions of chemokines and their receptors. Teaching includes undergraduate and graduate chemistry and biochemistry courses as well as curricular development at both levels.

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Abstracts of Best Practice Presentations

Barbara van Leeuwen

Innovative Approaches to Teaching Ethical, Regulatory and Legal Issues to Biotechnology Student

Barbara van Leeuwen

School of Biochemistry and Molecular Biology, Australian National University, Canberra

New biotechnologies raise highly contentious issues for humans and for our society. Science graduates need to be able to understand these issues so they can address the concerns of the public and constructively participate in debates that determine whether society will accept or reject a biotechnology. “Biotechnology in Context” is a course about ethics and attitudes to biotechnologies used in food, medicine and reproduction. This course uses novel approaches to present information and provide interactive learning experiences. One approach is the use of student discussion forums, called “debates”, to stimulate both individual and group creativity. Each tutorial group researches the issues for stakeholders in a case study, such as human cloning, and elects a representative to role-play a presentation of their findings at the debate. This allows a much deeper learning approach for each group and then a sharing of ideas at the debate, developing both team-work and communication skills.

Profile

Barbara van Leeuwen has worked in medical and applied research in Melbourne and Canberra since 1982. She has taught in Biochemistry and Molecular Biology at ANU since 1994. Her teaching interests are in the contextual issues raised by new biotechnologies such as genetic technologies related to food, medicine and reproduction. Her current research interests include the teaching of ethics to undergraduate science students and the ethics and regulation of new reproductive technologies.

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Discussion Paper for Breakout Session

Quality and Effectiveness in the Broad Educational Frameworks for Education Linked to Biochemistry and Molecular Biology

Tertiary science education in Australia faces a number of substantial challenges. Demand for science courses from secondary school leavers is dropping as it is in the United Kingdom. At the same time, University class sizes have grown substantially and the ratio of academic staff to students has dropped dramatically. We are each teaching more students and searching harder for students keen to continue in Biochemistry and Molecular Biology.

We also face challenges in funding models and demands for excellence. Universities are increasingly dependent on income from full-fee paying students, from competitive research grants and non-Government sources. We are reviewing our research performance in response to the Federal Government's Research Quality Framework initiative and are also urged to simultaneously improve our teaching performance by the Federal Government's Learning and Teaching Performance Fund. We are being asked to do more and more with a limited pool of resources.

Biochemistry and Molecular Biology teaching has many responsibilities. We train future researchers in our own field but these students are actually the minority of undergraduates in our classes. Our undergraduate classes teach students who will continue in other science disciplines, complete a professional degree or move into more diverse fields such as teaching, journalism or sales and marketing. How should we shape our courses to cater for this diverse audience and what do we hope to achieve?

We also play important roles in education outside the University. We contribute to secondary and primary school education through formal links with school and through informal contact through families and friends. Many of us are associated with programs to stimulate interest in science in our future students such as the Science and Engineering Challenge. Together we are a significant resource for the general public and sometimes we contribute to public debate.

So, where is the role of ASBMB in this scenario? What objectives should ASBMB have regarding tertiary education? How can ASBMB effectively support tertiary education? Should ASBMB be more active in promoting science in schools and in the community? How can we contribute in an effective manner?

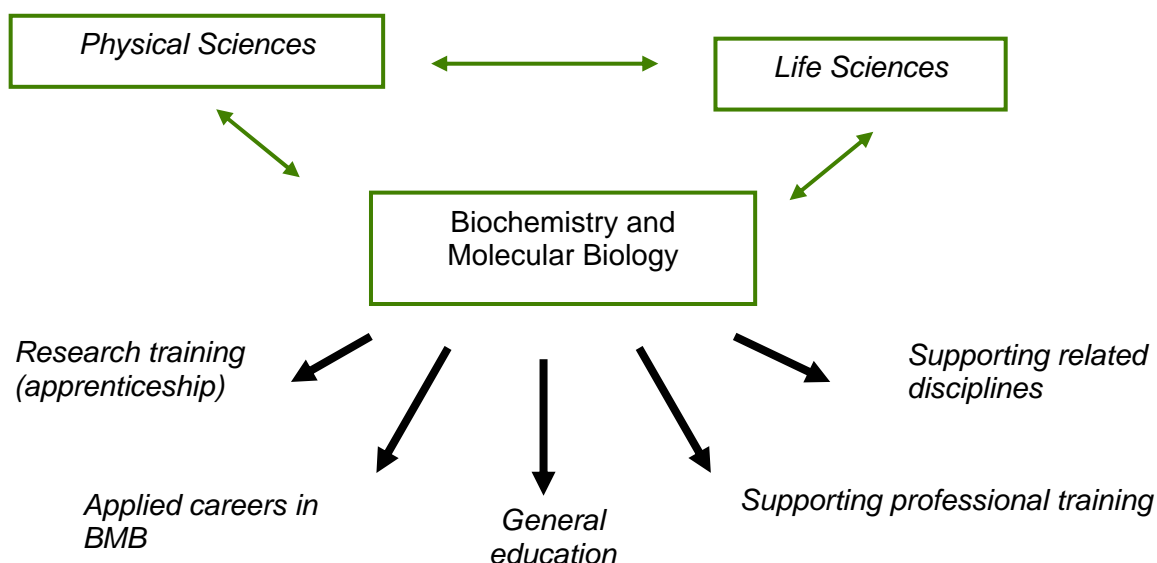
This workshop aims to define the major issues in education to which ASBMB should contribute. It will provide an opportunity to define possible objectives and to explore new initiatives for ASBMB in supporting tertiary education and in the broader community.

Elizabeth Johnson

La Trobe University

October 2007.

Discussion Paper for Breakout Session



What roles should ASBMB undertake in tertiary education?

Possibly:

| Objective | Why? | How? |
|---|---|--|
| Sharing good practice | Facilitate excellent teaching management and design | Annual conference e-learning networks |
| Share resources | Facilitate introduction of good teaching practice | Annual conference e-learning networks |
| Celebrate excellence in teaching | Encourage and support good practice | ASBMB teaching award (s?) |
| Developing policy statements eg: Graduate outcomes Assessment standards Role of lab practice | Establish good outcomes for Biochemistry graduates | ASBMB working groups |
| Comment on public policy in science | Provide expertise for government policy (eg funding for science teaching) | Through FASTS? |
| Increase profile of science in the community | Increase interest in BMB and increase numbers of students in BMB | Support initiatives with advice, register of participants, funding. Including (eg): peer-mentoring schemes Scientists in Schools Special projects: CSIRO Double helix club, CSIRO student experience scheme |

List of participants

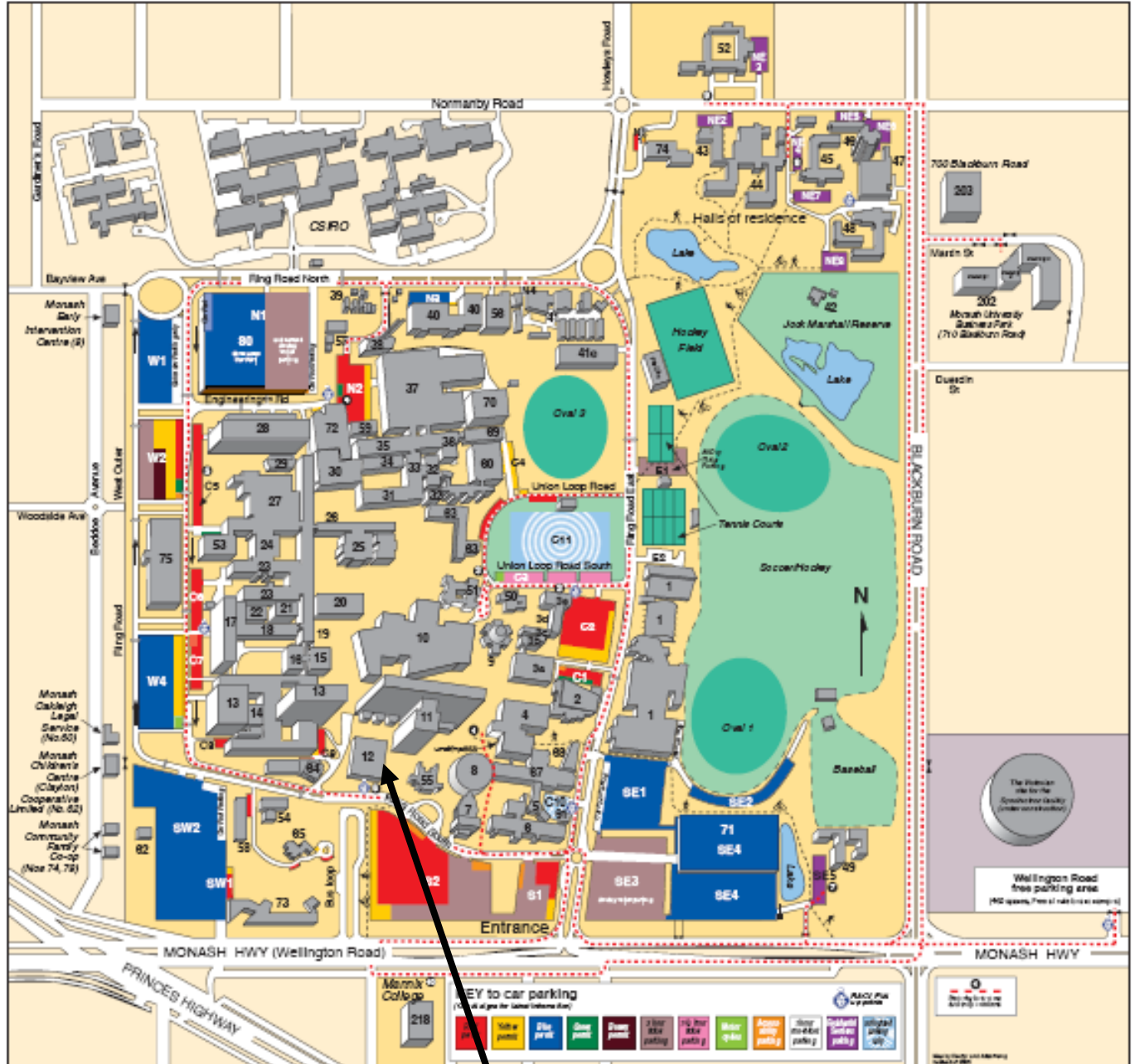
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Maps

Monash University Clayton campus



Law Building 12,
(Lecture Theatre L4)

Maps

Key to Monash University Clayton campus map on previous page

| | | | | | | | |
|-----------------------|--|-----|--|----|---|-----|--|
| Building index | | | | | | | |
| 1 | Spots and Recreation | 22 | First Year Biology Laboratory | 46 | Howitt Hall | 73 | Monash International/Monash College |
| 2 | Sir Robert Blackwood Concert Hall | 23 | Senior Chemistry | 47 | Central Building (Catering) | 74 | Monash Science Centre |
| 3a | Administration Building 3a | 24 | Western Science Lecture Theatre | 48 | Deakin Hall | 75 | Monash S.T.R.J.R. 1 |
| 3b | Administration Building 3b | 25 | Eastern Science Lecture Theatre | 49 | South East Flats | 80 | Multi-level carpark - North Ring Road |
| 3c | Administration Building 3c | 26 | Physics and Computer Science | 50 | Monash University Club | 202 | Monash University Business Park - (710 Blackburn Road) |
| 3d | Administration Building 3d | 27 | Senior Physics | 51 | Monash Short Courses Centre | 203 | (700 Blackburn Road) |
| 3e | Administration Building 3e | 28 | Mathematics and Information Technology Services | 52 | Normanby House | 210 | Mannix College |
| 4 | Sir Louis Matheson Library | 29 | Northern Science Lecture Theatre | 53 | Microbiology | | Theatre index |
| 5 | Krongold Centre | 30 | Hargrave-Andrew Library and Cafeteria and Facilities and Conference Office | 54 | Japanese Studies Centre | 63 | Central One |
| 6 | Education | 31 | Engineering Building S1 | 55 | Gallery Building | 32 | Engineering E1-E6 |
| 7 | Alexander Theatre | 32 | Engineering Lecture Theatre | 56 | Central Store, Transport and Mail Services | 60 | Engineering/Examination Halls E11-E14 |
| 8 | Rotunda | 33 | Engineering Building 33 | 57 | Grounds Building | 12 | Law School L1-L5 & G20 |
| 9 | Religious Centre | 34 | Engineering Building 34 | 58 | Yenssorge Building | 13D | Medicine M1 |
| 10 | Campus Centre | 35 | Engineering Building 35 | 59 | Australian Pulp and Paper Building | 13A | Medicine M2-M3 |
| 11 | Humanities | 36 | Engineering Building 36 | 60 | Engineering Building 60 | 11 | Medicine - Humanities H1-H10 |
| 12 | Law including Law Library | 37 | Engineering Building 37 | 61 | Parking and Security | 8 | Rotunda R1-R7 |
| 13 | Medicine | 38 | Boiler House | 62 | High Voltage Switchroom | 25 | Science S1-S4 |
| 14 | Teaching Facilities Support Unit | 39 | Botany Experimental Area | 63 | Faculty of Information Technology | 34 | Science S5-S6 |
| 15 | Centre for Medical and Health Sciences Education | 40 | Facilities and Services | 64 | Faculty of Medicine Office | 21 | Science S7-S8 |
| 16 | Biochemistry Teaching Laboratories | 41 | Animal Services | 65 | Monash House (Marketing and Public Affairs) | 25 | Science S9-S12 |
| 17 | Biology | 41a | Animal Services 41a | 67 | Information Services Building | 29 | Science S13-S15 |
| 18 | Senior Zoology | 42 | Zoology Environmental Laboratories | 68 | Performing Arts Precinct | 25 | Science S11-4, ST7 |
| 19 | Central Science Block | 43 | Richardson Hall | 69 | Engineering Building 69 | 64 | South One |
| 20 | First Year Chemistry | 44 | Roberts Hall | 70 | Accident Research Centre | 72 | Sir Alexander Stewart Theatre E7 |
| 21 | Zoology Lecture Theatre | 45 | Famer Hall | 71 | Multi-level carpark | | |
| | | | | 72 | Engineering Building 72 | | |

Car Parking

Traffic regulations under the Road Safety Act 1986 are enforced throughout the year. The University's roads, carparks and grounds are subject to the provisions of the Road Safety Act and 'loose cars' apply to law and/or damage of vehicle. Weekly visitors may only use those carparks designated as TICKET PARKING unless prior arrangements have been made with the Parking Office.

Security

Drivers are advised to ensure their vehicle is securely locked and all valuables are stored out of sight. Staff working late at night are advised to contact Security Control regarding security escort to their vehicles. The Security Blue proceeds in stop number order and leaves stop 1 at half hourly intervals from 5.30 pm, the final run commences at 12.15 am. Buses may be flagged down at any location and will deliver passengers to individual cars on campus (including Wellington Road Car Park) upon request.



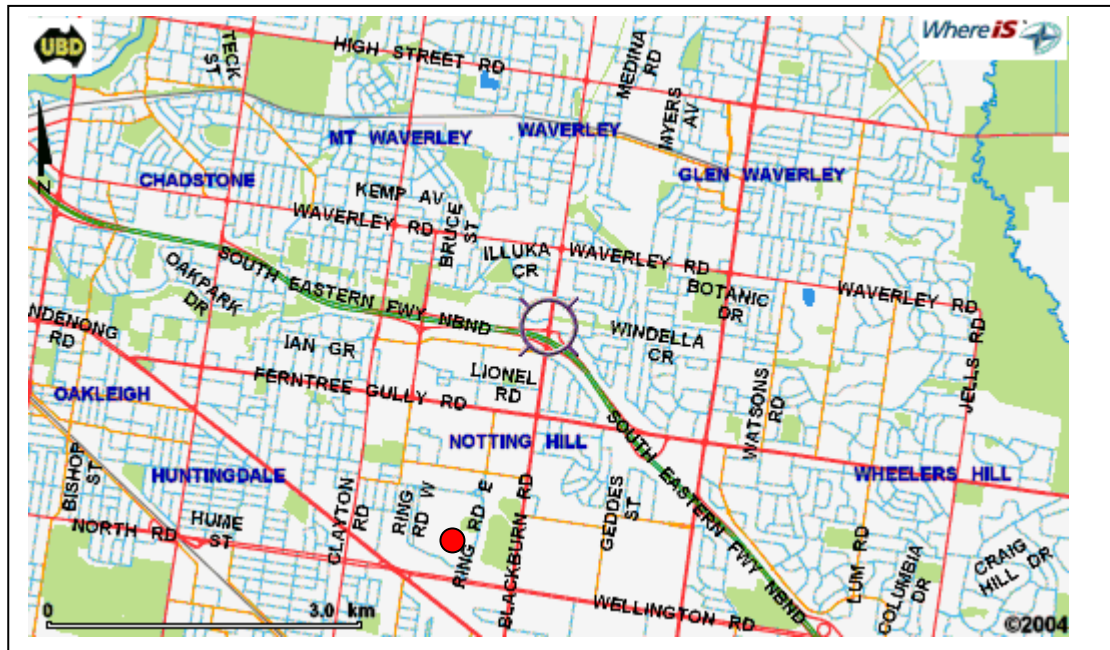
Maps

Location of dinner venue:

Bruce County Motor Inn

445 Blackburn Road, Mount Waverley

6.30 for 7.00 pm, Monday 10 December 2007



**Red dot = Location of HODs/Education reps meeting in L4
on Monash University, Clayton campus**

Spiked ring = Location of Bruce County Motor Inn