The University of Sydney

Biology News

Newsletter of the School of Biological Sciences (incorporating Botany & Zoology)

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On-line at www.bio.usyd.edu.au/Newslett/frontpage.htm

HEAD SPACE

It is with mixed feelings that I write this – my last piece as Head of School. I look back on my three years as Head with exhilaration, a sense of achievement, some frustrations, lots of hard work and a deep sense of thanks to all members of the School. I have not actually run the School - the School really is run as a collective. Instead, I have guided some things, acted as the sounding board for many people, signed the paperwork and, importantly, acted as the conduit between the School and the rest of the University. Whether I have been successful as Head is up to you and others to judge, and it is not easy to know how much I have influenced some of the School's achievements over the last few years. Perhaps those achievements were inevitable. The School has, however, provided demonstrable leadership within the Faculty in a number of areas, the most important of which is probably the completion of our Strategic Plan. I believe that the process of developing our Strategic Plan was very important in the School;

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RECOLLECTIONS OF BUILDING SAGAS - MIKE'S PERSPECTIVE

While clearing out his room prior to his retirement, George Barrett discovered this artist's impression of the new School of Biological Sciences building, scheduled to be built next to Biochemistry in a new sciences precinct in 1975!

I began in the School in 1989 and there was no new building. At the time, the building infrastructure of the School could only be described as dilapidated. The story was that all works on our current buildings were on hold because the School was getting a new building. Apparently, the first sod of the new building was to be turned in December 1975, but Malcolm Fraser put a hold on all public building programs in November, 1975, after the Governor General sacked the Whitlam Government. Hence, "our" building was put on hold, which was still its status when I began in 1989. A new Vice Chancellor, Professor Don McNicol, addressed the School in 1990 and was the first person to publicly state that a new building for the School was off the agenda.

Professor McNicol's statement provided the leverage to repair, upgrade and expand our buildings. The many changes since include the removal of the lecture theatre, upgrading labs to PC2 standard, and now redevelopments in the Stephen Hales labs and photography suite in the Macleay Building, and the construction of a new wing, rebuilding of the lecture theatre, and the creation of three floors out of two in the Heydon Laurence Building. Nevertheless, one of the School's main difficulties still is dealing with poor, inappropriate and insufficient space. So, what of the future?

Now there is a new plan for a biomedical precinct in an arc of seven buildings behind the University ovals from the Centenary Institute to the Vet School. We are earmarked to be part of that development. Unification of the School into a single space would immediately solve many issues for the School, and being located adjacent to cognate disciplines such as Molecular and Microbial Biosciences, the Vet. and Ag. faculties, and parts of Medicine, would enhance cross-disciplinary research opportunities. Will it happen? We must remain optimistic and, indeed, I have been assured that we should be ready to move into new accommodation by 2012, the 50th anniversary of the creation of the School of Biological Sciences. We will see.
M.B. Thompson

Artist's impression of the proposed biology building circa 1960

HEADSPACE

it was a whole of School project and provides a robust blueprint for future developments that is clear to everyone.

Robyn Overall will write the next of these columns as the new Head. She will inherit a robust School that has undergone considerable improvement in physical infrastructure and has a very dynamic intellectual environment.

The research environment is excellent, with a trebling of the numbers of postdoctoral staff, the recruitment of many new continuing staff over the last three years and an exponential increase in ARC income annually since 2002. Challenges facing the School into the future include ongoing space problems, dispersal among six or more buildings and a rapidly changing teaching environment – cross disciplinary and inter-faculty units of study are becoming common.

I will close with some thanks, which is dangerous to attempt for fear of leaving out someone. Hence, I will make my thanks largely generic and include all members of the School. I have felt particularly well supported by the various committees, their Chairs and the School Office. My ex-officio membership of most committees, and my one-on-one meetings with members of the School, clearly reveal a widespread dedication, professionalism and loyalty to the School, which is great for everyone. Three people have been of paramount importance to me because they have organized my life to enable me to be as productive as possible as Head. Suzan Ramsey has been fantastic in arranging my diary, meetings and countless other things, Jacquie Herbert has run the lab and been central to me maintaining my research profile, and my wife Jo has organized virtually all other aspects of my life. Thank you, everyone.

Mike Thompson
January 2008

THE PARKER LAB OPENS!

BIOMIMETICS OF OPTICAL NANOSTRUCTURES

By Andrew Parker

I began work on a diversity of optical reflectors (iridescence) and antireflectors (stealth surfaces) in nature in 1990, and found many designs not currently employed in the £1 billion annual optics industry. Other workers have joined this field since and found other novel reflectors. These include the nanostructures behind butterfly, beetle and hummingbird "metallic" colours.

I had one design employed (anti-reflectors on solar panels) but generally industry was slow to investigate the potential of the natural reflectors (despite much hype). This was mainly because the natural nanostructures are too complex, at such a small size, to be manufactured efficiently on a commercial scale.

I set up a new project to investigate if we really can manufacture nature's iridescent structures, but also to discover how the living cells, of animals and plants, make their optical nanostructures. The results are reported in the Nature Nanotechnology paper (June 2007).

First my research team and I found that there are techniques at the cutting edge of optical engineering that can be used to make many of nature's optical nanostructures, although often only in minute amounts (a few microns square). However, we uncovered a new potential for optical engineering via cell culture.

We dissected a butterfly chrysalis, kept alive the cells that develop to produce the wing scales (which contain the optical devices), used growth hormones to induce these cells to develop naturally, and we successfully cultured a blue iridescent butterfly scale in the lab. This technique could be replicated at an industrial level.

Further, we cultured single-celled "diatoms" that have a silica covering with unique optical effects. By altering the culture media we altered the cell's development. This affected the nanostructure that causes the iridescence, and so changes the quality of the light reflected and transmitted – the device could be "made to measure". We predict that tonnes of such optical devices – useful for iridescent paints, cosmetics or security devices – could be made via cell culture per day.

While the live cells were under specialized microscopes, we could observe the process of nanostructure manufacture, and found that the cells have a whole engineering factory within them. This provides useful information for evolutionary study, as well as a process for the optical engineers to emulate. Unlike engineered nanostructures, the natural nanostructures are biodegradable and hence environmentally friendly. The natural engineering process takes place at low temperatures and pressures, and has a low carbon footprint.

RESEARCH TEAM **Rama Heidari** commenced her new postdoctoral position as a biochemist at the School of Biological Sciences with Prof Andrew Parker in May 2007. Rama previously worked at CSIRO Entomology, ANU RSC and John Curtin School of Medical Research in the areas of protein biochemistry, various cell culture systems and bioremediation and yielded international patents plus publications.

Michael Watts did his BSc(Hons) and PhD in Information Science at University of Otago, NZ on computational intelligence. After his PhD Michael worked in the National Centre for Advanced Bio-Protection Technologies, where he used intelligent systems to model the establishment of insect pest species and crop diseases. Here he models the environmental impact of businesses to find ways of reducing that impact.

SPOTLIGHT

Dr Adele Pile

Marine Scientist

What exactly do you do ?

Of the Earths surface 67% is covered in water greater than 1000 m depth and only 5% of that has been explored. My job is to explore the planet using manned submersibles and underwater robots, to find out what is living there and conduct experiments to determine how they do it. A good portion of my time is spent at sea on research expeditions or on oil rigs exploring the sea floor. Then there is a lot of time at the computer analysing data and writing about my findings. I also teach...

How did you come to do this work?

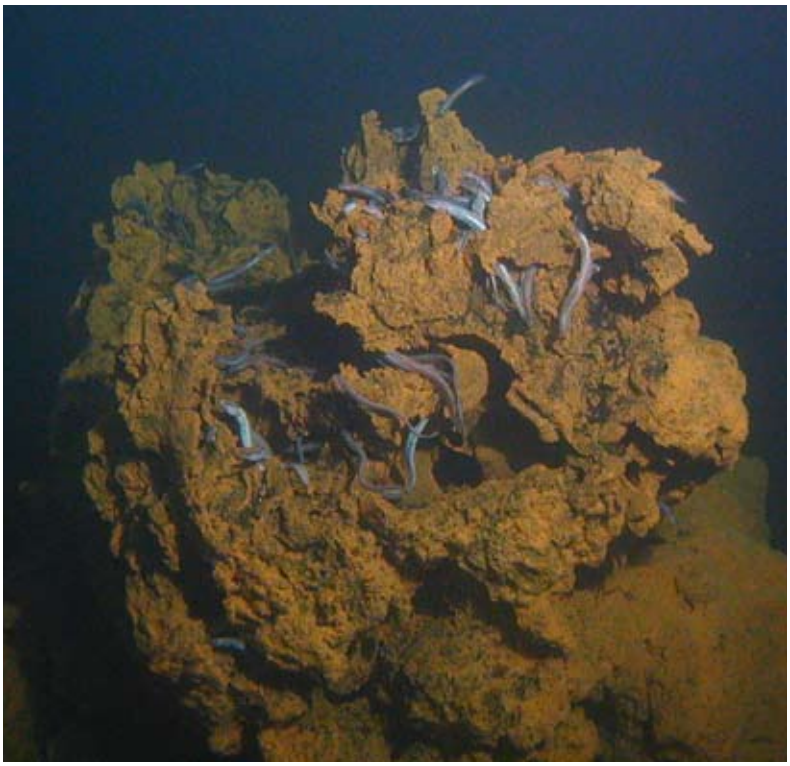
When I was 8 years old I watched a very fuzzy black & white image of Neil Armstrong taking the first steps on the moon. I thought to myself that being an explorer would be a great job and thought that only place left to explore was outer space so I wanted to become an astronaut. Then at uni, to my amazement, I learned that most of the Earth had yet to be explored. This surprised me because I figured if we were going into space that we must know everything about our planet.

Photo: Adele Pile

I then decided I wanted to study the unexplored life on our own planet.

What path did you follow /or not, to get to where you are now?

I had difficulty figuring out what I wanted to be when I grew up...so after high school I became a professional firefighter while I figured it out. After 7 years of that I went to uni and actually obtained a Bachelor of Arts in Biology. As part of my studies I did a semester at one of the most famous of all marine biology labs;



Woods Hole. From there I was hooked (no pun intended). I then went on to complete a Masters and PhD in Marine Science and during this time went on all sorts of expeditions to places like Lake Baikal in Siberia, the worlds oldest and deepest lake, and lived underwater for 10 days in Aquarius (an undersea laboratory in Florida). After finishing uni most new scientists first job is to work with a more established scientist, like an apprenticeship, and I did mine with a deep sea scientist. It was then that I went on my first manned submersible mission to the deep sea.

What sort of skills are necessary in your job?

You have to be able to think on your feet because you never know what you may find out there so that means you need to have studied and learned about a lot of different subjects from ocean currents to the types of bacteria in the water. You need to be strong in maths and a very good writer because that is how we tell people about our findings. You need to be able to work in teams with all types of people because you depend on the pilots that operate the robots and submersibles and their knowledge to help you with your experiments.

What do you like about your job?

I get to be the first person to see new places and exotic animals on our planet.

is it your dream job or is that still to come?

This is my dream job. I wake up every morning and can't wait to get to work to see what new life forms I might learn about today.

What advice would you give to anyone considering a career like yours?

Don't give up. A taxi driver once said to me when I told them about my job that it was like being a Rock Star, everybody wants to do it but only a few people ever get the chance. If you believe in yourself others will believe in you too.

What is a "usual" day?

When exploring, we spend the day either in the sub/rov shack or processing the samples. When off shore on the oil rigs, we first prepare the robot and experiments for the day's work, launch the robot and then the pilots operate the robot while I ask them to do things. This all takes place in a pretty specy room and we watch what is going on from the cameras on the robot on big monitors. At the end of the day we process the samples.

Where exactly do you work?

My office is at Sydney Uni. But field work can take me anywhere. Right now we are doing a lot of field work on the Northwest shelf of Australia off oil rigs.

WHO'S NEW?

Welcome to our new Science Communicator, **Carla Avolio**, who replaced **Adam Selinger** in December 2007. Photo: J.Herbert

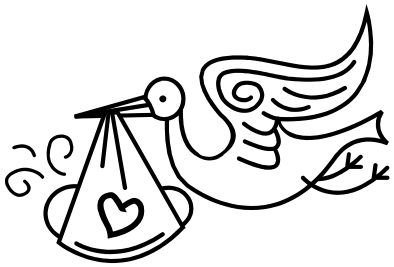
Photo: T.Latty

Dr Tanya Latty started as a Postdoctoral Fellow in November 2007. Tanya completed her Ph.D in insect ecology at the University of Calgary in Canada only to fly out 3 days later to Sydney to start research with Madeleine Beekman, studying dynamic problem solving in social insects. Her Ph.D focused on social behaviour in the mountain pine beetle, an outbreaking species of beetle that cooperatively kills trees. Tanya loves invertebrates (especially insects), and is particularly interested in the behavioural ecology of social insects.

HATCHES MATCHES & DISPATCHES

To Natalie and Nick, a daughter Siena, 4kgs, 50cms long. First grand-daughter to proud grandad **Claudio Muhlrad**. Photo: C.Muhlrad

Meet Hannah Rose **Selinger**, born on Christmas Eve, 2007 at 9.28 pm,weighing in at 3.28kgs and 51cms tall. **Adam** and Danielle stoked! Photo: A.Selinger



Born to **Osu** and David on December 27th 2007, a baby girl Arissa (3.66kgs and 50cms long). Family all well.

DISPATCHES

Adam Selinger (Science Communicator) left in October 2007 to take up the position of Executive Officer of the Science Foundation for Physics (remaining at Sydney University).

Louie Briskoski (School Finance Officer and keen cricket player) was seconded by the Faculty of Science in October 2007 and began a new position of Finance Project and Business Services Management. A joint farewell lunch was held for Adam and Louie in the Carslaw tearoom and a great time was had by all.

Nathan Lo (Postdoctoral Research Fellow) started at the Australian Museum of Natural History as a research scientist in January 2008. He will be working on biodiversity of termites, cockroaches and other arthropods at the Museum and will remain connected to SOBS as an Honorary Lecturer.

Shauna Murray is taking up a VC Fellowship postdoc at the University of NSW but will continue to collaborate with **Dr Frank Seebacher**.

Server **Huxley** was formally declared DOA late last year, but has been replaced by a new server **Besly**, named after Mary Besly who was an invertebrate zoologist and long-standing member of SOBS.

At the farewell function for Louie and Adam in Carslaw. Photo: J.Herbert

SHINE LAB CHRISTMAS BASH

The Kris Kringle event where many nice gifts were given, and stolen back again....

Professor Shine showing off his Christmas present

The Shine lab Xmas bash in A08

Just what the doctor ordered – wonder if these were stolen?

GEORGES RETIREMENT LUNCH

This has been a busy few months for social events: in addition to Louie and Adams farewell, we had a farewell lunch for **George Barrett**, who retired after spending 28 years at the School of Biological Sciences at Sydney University. Lunch was held at the Sumalee Thai restaurant at the Bank Hotel in Newtown and was attended by more than 60 friends and colleagues. A few old firends turned up for lunch as well; there was almost a complete set of early 80s Technical staff in attendance.

The good old days? Members of the Zoology tech staff from the early 80's Photo: J.Herbert

Mike and friends seeing George off the premises at the retirement lunch in Newtown! More than 60 friends turned up for the lunch. Photo: J.Herbert

THE SCHOOL CHRISTMAS PARTY

The Christmas party was held on the afternoon of the 17th December on the Botany lawn. There were more than 70 people present for an afternoon of merry making in the lead-up to Christmas. The parrot fish pinyata was a great success, with one of the final swings knocking it out of the tree altogether with severe damage to its underbelly. There were plenty of eager kids in attendance to pick up the lollies! The cricket game was a good practice for the upcoming cricket social on the 20th February.

Very close to making it into the 'Hatches' column is Jo with Julie and Emily enjoying a chat at the Christmas party. Right: Greg Sword's son checking out the pinyata (rocket launcher in background!)

Ben practicing his swing on the pinyata

Priming up for a game of cricket - Fabian, Steve Simpson, Silvain, Ben and Greg Sword talking tactics.

Some of the lucky (or not so lucky?) door prize winners - love those mushrooms!

Incoming Head of School Robyn Overall addresses SoBs. Photo: J.Herbert

PRIZES, AWARDS AND GRANTS

Dr Min Chen received a grant for GO8 Australia-Germany Joint Research Co-operation Scheme, which provides travel funding over 2 years for co-operative research between Min Chen at The University of Sydney and Wolfgang Hess from Freidburg University. Visiting researchers from Freidburg University are set to arrive in February.

Bridget Murphy and **Amanda Lane** won prizes for best Honours and PhD presentation respectively at the 2007 Australian Society of Herpetologists conference.

Bridget works on evolution of viviparity in Australian skinks supervised by **Prof Mike Thompson**, and Amanda is completing her PhD on genetic diversity of Laticaudid sea kraits with **Prof Rick Shine.**

Amanda Lane with her prize at ASH 07
Photo: J.Herbert

Bridget Murphy with her prize
Photo: J.Herbert

CONFERENCES

SoBS had a huge presence at the 2007 Australian Society of Herpetologist conference held in beautiful Albany, WA. 12 members from **Prof Shine** and **Prof Thompson**'s lab attended and gave papers. **Prof Shine** was also a keynote speaker at WA Premier's Science Awards in Perth.

The 2007 Ecological Society of Australia conference was also well attended, with **Prof Chris Dickman** and **Dr Glenda Wardle** giving presentations.

MEDIA

Quick, skip, the cousins face extinction (Sydney Morning Herald, 2 January 08) and Weekend Gold Coast Bulletin (22 December 07) featured **Prof Chris Dickman**'s new book A fragile Balance.

Climate change theory squelched quotes **Dr Charles Warren**'s research in Hobart Mercury on 2 Jan 08.

Appetite Drivers, **Prof Steve Simpson**'s research is reported in West Australian 9 January 08.

BOOKS

A Fragile Balance: the extraordinary story of Australian marsupials. **Chris Dickman**, illustrated by Rosemary Woodford-Ganf. 2007

NSW Biology. Carloyn Jeffery and Pauline Ross. 2007.
Dr Raymond Ritchie is a contributing author in chapter 13 - Biochemistry. This HSC textbook contains highlights on **Prof Chris Dickman**, **Prof Ian Hume**, **Prof. Ian Suthers** and other SOBS graduates.

Animals of Australia: out on their own? Eds: **Chris Dickman,** Daniel Lunney, Shelly Burgin. 2007

INTERNATIONAL VISITING RESEARCH FELLOW

Photo: T.Bibby

The research group of **Dr Min Chen** is hosting **Dr Tom Bibby** for three months from January – March 2008.

Dr. Tom Bibby completed a PhD on the molecular basis of photosynthesis at Imperial College, followed by a post-doctoral position at the Institute of Marine and Coastal Sciences at Rutgers University, USA.

Tom moved back to the UK where he has been a research fellow at the National Oceanographic Centre in Southampton for two years.

Here, Tom and Min Chen aim to elucidate the molecular ecophysiology and global distribution of the recently discovered marine cyanobacteria Acaryochloris. The genome of Acaryochloris has recently been sequenced – through collaboration involving Min Chen – and so this represents an exciting and timely opportunity to conduct research.

Seminar Co-ordinators for 2008

Postgraduate seminar
co-ordinators: Dr Scott Parker and Dr Debbie Barton

SOBS Friday seminar series
co-ordinator: Dr Ashley Ward and deputy co-ordinator: Dr Slade Jensen

POSTGRADUATE AWARD

From left to right: David Pike, Nadine Chapman, Isabel Walter, and Amanda Lane holding her winners cheque for $1000 (the real one is in the post!) with Head of School, Professor Mike Thompson. Thursday 13th September 2007. Photo: MRicketts

EDITORIAL

Welcome to the bumper fourth issue of Biology News. As the new editorial team, we would like to wish everybody a happy new year.

Many major changes have taken place with the end of 2007. Our beloved **George Barrett** retired after 28 years of service to SOBS, and **Prof Mike Thompson** came to the end of his term as Head of School and is handing over the flame to **Prof Robyn Overall**.

On behalf of SOBS we would like to thank Mike for his tremendous work as Head of School and wish him the very best for the future. To Robyn, we extend the warmest welcome, and look forward to working under her leadership.

XXXXXXX Carla Avolio and Katie Jakes

Submission deadline for the next edition of Biology News is Febuary 29th.

You can email us at news@bio.usyd.edu.au or post to Room 518, Carslaw Building (F07), The University of Sydney NSW 2006.

Archived newsletters are at www.bio.usyd.edu.au/Newsletter/frontpage.htm

ALUMNI

Welcome to the section of our newsletter with the news and stories for past members of the school.

DIARY DATES

FRISBEE ON THE FRONT LAWNS
This is a regular event held every Wednesday afternoon from 5pm on the front lawn - everyone is welcome and encouraged to come along!

HEAD OF SCHOOL'S MORNING TEA
(out with the old and in with the new!)
This will be held on Wednesday 30th January at 11am in Carlsaw room 535. Come along to farewell Mike and welcome Robyn to the Head of School position.

AU REVOIR DINNER FOR MIKE
There will be a dinner for Mike to thank him for all his wonderful efforts as Head of School over the last 3 years. This will be held at the Sumalee Thai restaurant downstairs at the Bank Hotel in Newtown; the booking is for 6pm for 6.30pm start and cost will be $15 per head (plus alcohol).

SOCIAL CRICKET MATCH AND PICNIC
There will be a social cricket match and picnic to be held on Wednesday February 20th in Victoria Park. This will kick off at around midday (team selection and food), followed by a friendly game. Cost will be $12 per head - more details via email soon.

If anyone hears any social news, please forward it to Katie Jakes (with a photo or two if possible) ready for insertion into the next issue of the Newsletter. Acknowledgements for photos in this issue go to Jacquie Herbert, Carla Avolio, Jo Walker, Malcolm Ricketts.

MURRAY LECTURE 2007

Professor Francis L. W. Ratnieks held the position of inaugural visiting Murray Lecturer in 2007. The lectureship, named in honour of Patrick Murray, was established by the School of Biological Sciences to bring an internationally noted academic to present public lectures and provide mentoring for postgraduate students.

Prof Ratnieks – who held the lectureship during September – participated in Honours Awareness Week activities, held a postgraduate workshop, and gave a public lecture and School seminar.

Francis Ratnieks is Professor of Apiculture at Sheffield University. His research group is a world leader in social insects, particularly the honeybee, and has published more than 100 journal articles, contributing almost half the bee research done in the UK.

His evening public lecture – Can Humans Learn From Insect Societies? – held at Eastern Ave Auditorium was a true social insect experience, with colourful graphics, living bee colonies and honey tasting to complement Prof Ratnieks' address on the honeybee *Apis mellifera*, which he argued was the world's most remarkable animal.

Not only is the honeybee a valuable economic partner – producing a million tons of honey and pollinating crops worth tens of billions of dollars every year – they have been the focus of study for thousands of years and continue today to be a source of remarkable scientific discoveries. Recent research at the University of Sydney by one of Prof Ratnieks' previous post-docs, **Madeleine Beekman**, and students in her lab, has revealed a far more complex side to the sex life of a bee than previously suspected, and suggests that there is still plenty to learn about the humble honeybee.

Francis, Ben and Mike at the Murray Lecture 2007

WHERE ARE THEY NOW?

Dr Jim Hone B.Sc. Zoology 1981, is now Professor of Wildlife Management at the University of Canberra. During his time at SoBS, Jim enjoyed talking about wildlife ecology with Graeme Caughley and Charles Birch, two intellectual giants in the field.

Joanna Willmott B.Sc. (Hons) 2000, supervised by Murray Henwood, is currently working at the Hawkesbury-Nepean Catchment Management Authority as a river health catchment officer. Memories of SoBS include dark days working in a storeroom cupboard during honours while A12 underwent renovations.

WHAT'S YOUR BUSINESS?

With this edition of Biology News we continue our initiative to find out what our Biology Alumni are up to now. We invite you to send us your business cards (put your speciality and graduation date on the back e.g. genetics, '88). Cards will be mounted in a frame in our First Year Biology corridor to inspire new students with the wealth of career opportunities that await them!

Please send to: Alumni Committee
c/ Science Road Cottage A10
University of Sydney, NSW 2006