Next year marks the 50th anniversary of the School of Biological Sciences at the University of Sydney. To celebrate this milestone, the School will commission a museum exhibit and host a range of public events to highlight its achievements and plans for the future.

Since its conception in 1962, when Professors Robert Crocker and Charles Birch convinced their colleagues of the value of combining Botany and Zoology into one school, the School of Biological Sciences has been focused on integrating the diverse fields of biology and promoting cooperative research.

The School combines expertise from molecular biology, genetics, cell biology, physiology, behaviour, biodiversity, ecology and evolution of Australian plants and animals, and student learning in biology. Together, the School’s researchers tackle issues such as conservation of biodiversity, management of natural resources, disease control, invasive animal control and obesity.

Professor Robyn Overall, Head of School, said:

“Biological knowledge has become crucial in our everyday lives as we assess our use of new technologies such as genetically modified foods or new medical tools. It is crucial to our long-term survival and that of the natural environments in which we coexist.”

“Over the past 50 years the School has made some extraordinary advances, including pioneering work in quantitative marine and terrestrial ecology, the early development of molecular biology tools and the discovery of “jumping” genes in Drosophila, and in plant membrane biophysics. Much of the School’s current work - such as studies spanning from the genetic basis of a behaviour through to the ecological consequence of that behaviour - is possible due to the cross disciplinary research in an integrated School.

“We look forward to the next 50 years as new technologies in areas such as molecular biology and informatics allow us to discover and unravel the fundamental mechanisms and processes that control life.

“Next year, we invite all our alumni to share in the School’s 50 year anniversary celebrations. We have many activities planned, so we hope to see many people there. It is our way of thanking you for being part of the School and contributing to its success.”
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EDITORIAL

EDITOR:
CARLA AVOLIO

ROOM 130, MACLEAY (A12) THE UNIVERSITY OF SYDNEY 2006

HEADSPACE

Next year is the School’s 50th Birthday and we are planning a number of events to mark this milestone and share half a century of memories with our alumni.

If you have not made it to one of our annual alumni events yet, 2012 will be THE year to make the effort to reconnect and share your memories from your student days.

This year our alumni event will be a day at our Pearl Beach field station, fondly known as Warrah, on Saturday 22 October. There will be tours of the rock platform and nearby bush led by members of the School. Look for the invitation in this newsletter and on the alumni section of our School website.

Everyone is warmly invited to join us for the 2011 Murray Lecture to be delivered by Dr Jim Haseloff from the University of Cambridge who will speak on Synthetic Biology: the next gen of GM. You will be treated to some spectacular images of fluorescent markers used in biology and challenged to think about the possibilities for artificially producing life. The lecture will be held on 10 August 5.45-6.45pm in the Eastern Avenue Lecture Theatre followed by drinks in the foyer. Please register to help with our catering at: sydney.edu.au/biology

Our newest alumni, who graduated in May, were treated to an occasional address from our alumnus Dr Paul Willis. Dr Willis spoke to the students afterwards at the Biology Graduation Reception about the joy of being a researcher at the forefront of discovery. Following a successful career as a science communicator on the TV show Catalyst, Dr Willis has been appointed recently as Director of the Royal Institute of Australia, a position most recently held by our previous Vice-Chancellor the late Professor Gavin Brown.

I trust that you enjoy will this newsletter highlighting some of the recent activities within the School. In particular, I congratulate Associate Professor Glenda Wardle on the award of a Vice Chancellors Award for Excellence in Postgraduate Research Supervision and two of our younger staff, Dr Simon Ho and Assoc Prof Ashley Ward, for medals recognising early career research achievements awarded by their disciplines.

Looking forward to seeing you at the Murray Lecture in August or at Warrah in October.

With warm regards,

Professor Robyn Overall
Head, School of Biological Sciences
Sutherland council were really proactive Taren Point, which led the media and the hope of finding a new method of control. Cane toads have surprised biologists by within two weeks, 200 cane toads from a single place. But when the council pest officer arrived to eradicate the toads, they found 10 toads within half an hour. “Sutherland council were really proactive about this find and immediately brought in a consultant to investigate further,” says Dr Matt Greenlees, a herpetologist working with Professor Rick Shine’s cane toad research group ‘Team Bufo’.

Within two weeks, 200 cane toads had been found in Sutherland Shire’s Taren Point, which led the media and local authorities to speculate that this represented Sydney’s first breeding colony of toads. “Despite the large number of toads found, there was still some doubt as to whether this constituted a breeding colony or just a lot of toads all introduced at the same place,” said Dr Greenlees.

But that doubt was firmly eliminated in April this year, when Dr Greelees discovered a pond full of toad tadpoles in Taren Point. “Although we have caught over 500 toads from Taren Point since February last year, we only now can say for sure that toads are breeding in Sydney,” says Dr Greenlees. This population is the most southern breeding population of toads in Australia and demonstrates that toads are able to survive and reproduce in much colder conditions than previously thought. Dr Greenlees and Prof Shine are using the Sydney breeding colony to launch the first ever study of the biology and impact of toads in the southern part of their Australian range. With five years funding from an Australian Research Council Linkage grant, Dr Greenlees will also study the NSW population to field-test new methods for toad control.

“Toads are not only a Queensland problem,” says Dr Greenlees. “The main cane toad population has spread as far south as Yamba in NSW. While lots of work has been done on cane toad biology and impact in the tropics, our biggest knowledge gap now lies with the southern toads.”

Dr Greenlees will begin by studying the biology of the southern toads, in particular looking for weaknesses showing in the animals living at their thermal threshold. Next he will quantify the impact of toads on NSW fauna, which he says will be different from anything seen in the tropics. “The faunal assemblage in the southern toads’ range is totally different from that seen in the north, so we have no idea what will happen here. The only thing we have learnt for sure from studying cane toads in Australia is that you can’t assume anything.”

The third part of the project will be control. Dr Greenlees says NSW is an ideal place to test control methods since the southern toad front is moving more slowly than the north. “Because the Taren Point population is so isolated, we have a much better chance of using localised control methods to stop the population from spreading and even hopefully eradicate them. Developing effective methods for localised control or eradication is also exciting from a conservation perspective because if we find that a particular threatened species is suffering from toads, we can concentrate efforts around areas that are critical to their survival.”

Already at Taren Point, numbers of toads have decreased substantially from local control efforts. “Sutherland council have been doing manual removal and organising community musters, which has made a big dent in the population,” says Dr Greenlees. “Where last year I used to catch 20 toads a night, now I barely catch one.”

Dr Greenlees is a herpetologist who has become an expert on Australian cane toads since commencing research on them in 2004. As one of the first University of Sydney students to conduct research on Northern Territory cane toads, Dr Greenlees conducted honours research looking at the impact of cane toads on invertebrates in the Fog Dam field station near Darwin. “I really wanted any excuse to go to Fogg Dam and catch snakes,” remembers Dr Greenless. “The cane toad project was my ticket to the Top End, and I haven’t ever looked back.”

After falling in love with native frogs in NT, Dr Greenlees commenced a PhD examining the impact of toads on native frogs, discovering that although frogs will attempt to eat toxic toads, they are capable of learning to avoid them. “I think it is pretty clear that we are a long way away from developing a method of totally eradicating toads from Australia,” said Dr Greenlees. “The best hope we have of conserving native fauna at this stage is to shift our focus to target protection of those species or places where cane toads occur, rather than try to wipe out toads all together.”
Dr Simon Ho has won an Early Career Award from the Genetics Society of Australasia for making an outstanding contribution to the field of genetics within five years of his PhD.

An expert in molecular evolution, Dr Ho’s impressive body of work includes 57 peer-reviewed articles, which have been collectively cited over 2,300 times.

His research on molecular clocks has had wide-ranging impact on how we estimate rates and timescales of evolution. His most highly cited work involves the development of new methods to account for variation in evolutionary rates and to use the fossil record in estimates of evolutionary timescales. His work has had an important influence on studies of phylogeography, domestication, human evolution, and other areas of evolutionary research.

Dr Ho has also worked extensively in the field of ancient DNA, where he provides the theoretical expertise to complement his collaborators in the lab. This makes it possible to gain insights into megafaunal extinctions and the relationships between modern and ancient hominids.

Associate Professor Ashley Ward has won a medal from the Fisheries Society of the British Isles (FSBI) that recognises distinction in early career research.

The prestigious FSBI medal is awarded annually to a scientist under 40 who has made exceptional advances in the field of fish biology.

“As you can imagine, this is a huge honour for me, by far the biggest of my career,” said Prof Ward. “I was amazed, astonished and delighted when they told me! Quite a few high profile people have won this in previous years so I’m really honoured to have won the medal myself.”

Each year, the FSBI awards three medals, which recognise achievements of fish biologists around the world: the Beverton medal for life-long individual contributions to fish biology, the Le Cren medal for conservation, training or public understanding of the discipline, and the FSBI medal for exceptional advances in early career.

Prof Ward has spent over a decade studying the social behaviour of fish. His research in the emerging field of Collective Behaviour has given some fascinating insights into mechanisms behind the well-known “wisdom of the crowds” phenomenon.

“Essentially collective behaviour looks at whether a group of animals is simply a sum of its parts or if the individuals together produce something greater,” said Prof Ward. “And in many cases, they do.”

His body of research has shed light on the mechanisms by which groups ‘decide’, showing often that they make better decisions than individuals.

For example, in January this year, Prof Ward demonstrated for the first time that larger social groups make faster and more accurate decisions than individuals. This crucial benefit may have been important in promoting the evolution of sociality, a strategy used by a huge variety of animals from ants to humans.
AWARD FOR LIVERWORTS

PhD student, Endymion Cooper, was awarded the Postgraduate Research Prize for Outstanding Academic Achievement by the Faculty of Science for his remarkable work in resolving the phylogeny of one of the largest families of liverworts. As liverworts are the closest living relatives to early land plants, Endymion’s work promises to provide fundamental insights into the origin of terrestrial plants.

Endymion, who is working under the supervision of Associate Professor Murray Henwood, says he is grateful for the opportunity to travel around the world to collect data for his research.

“I am lucky that I was able to do field work in Australia, New Zealand and Chile (picture on left) to obtain critical species for my study, then travel to Duke University in the US to generate sequence data. I am very proud of the resulting manuscript and thankful for all of the help I have received from my colleagues,”

BIOLOGY SCOOPS VICE CHANCELLOR AND FACULTY PRIZES

Associate Professor Glenda Wardle and Dr Liz May have been awarded prizes for excellence in supervision and teaching by the Vice Chancellor and Faculty of Science.

Prof Wardle won the prestigious Vice-Chancellor’s Award for Excellence in Research Higher Degree Supervision, which she received at the graduation ceremony on May 27.

Head of School, Professor Robyn Overall, says: “I am thrilled that our staff are being honoured for their hard work. These awards show that our School is dedicated to performing at the highest level not only in research, but also in teaching, which is a foundation of the School and University.”

Prof Wardle is one of only two people to receive the coveted Vice Chancellor’s award this year, winning it alongside Prof Kathryn Refshauge, Deputy Dean of Health Sciences.

“Glenda is most deserving of this award, which recognises excellence in research higher degree supervision at the University of Sydney,” says Prof Overall. “In her role as Chair of the School Postgraduate Studies Committee, she has made an outstanding contribution to our postgraduate program. The supervision of her own research students is of the highest quality, and she has student testimonials to prove it!”

Prof Wardle is one of five people in the School to have won the award, joining previous winners Professors Rick Shine, Chris Dickman, Robyn Overall and Associate Professor Dieter Hochuli.

Prof Wardle says: “While I am delighted to win this award, I have to acknowledge my students as key to this success. Supervision of research is a collaboration and my students have all contributed to the outcomes.”

Also honoured for dedicated commitment to students was Dr May, who won the Faculty of Science Citation for Excellence in Teaching.

According to Prof Overall, Dr May is distinguished by her dedication for over a decade in the teaching of animal biology in second and first year units, which has inspired a passion for biology in generations of students.

“Liz provides wonderful pastoral care for students and she maintains a long-term interest in their progress. In return, the students hold Liz in the highest regard and say that she is responsible for igniting a thirst for more zoological research in them,” says Prof Overall.
WARRAH WINS IN COUNCIL ZONING

60 years of biological research and education can continue into the future after the University of Sydney successfully opposed Gosford City Council’s proposal to zone the Crommelin Research Station into an Environmental Conservation area where research activities would be prohibited.

Following submissions objecting to the proposed environmental zone, Gosford Council announced on May 31 their decision to zone the Crommelin Research Station, or Warrah, ‘SP1 Special activities’, which permits the land to be used for “Conservation, research and associated education”.

The decision comes as a huge relief for the School of Biological Sciences who has used the research station since 1948 as a facility for biological research, a venue for staff meetings and workshops, and place to provide thousands of undergraduate students with field-based excursions.

Head of School, Professor Robyn Overall says the zoning decision has preserved the University’s right to use the field station for biological research and education, as was intended by Minard Crommelin when she donated the land in 1947.

“Warrah is an indispensible part of the School’s research and teaching portfolio. I am thrilled that after more than 60 years of successful operations at this site, we can continue to use this important NSW flora and fauna facility on our own terms.”

Michael Joseph, School Manager, says the council’s decision to zone Warrah as ‘Special Activities’ is significant because the original Environmental Conservation zoning was unsuitable for the School’s current and future objectives for the field station.

“Unlike what was proposed, the new zoning gives us the opportunity to renovate Warrah in the future. Should we be so lucky as to have another benefactor as generous as Minard Crommelin, we could apply to the council to start building works to improve on what we already have.”

The Crommelin Research Station is situated in Pearl Beach in the NSW Central Coast and is known universally in the School as “Warrah”, an Aboriginal word meaning “a wide view”. The 2.63 hectares was donated to the University of Sydney in 1947 by Minard Crommelin “to be devoted to the purpose of seeing established thereon in perpetuity a biological and natural field station for research into and for the promotion of the study and the improvement and preservation of the native flora and protection of native fauna.”

Since that time, the School has used the property for diverse research and educational purposes with an emphasis on botanical, zoological and marine ecological studies.

Of the many thousands of students who have stayed at Warrah, almost all remember with great fondness the special atmosphere of the station - sleeping five or six to a room in bunk beds, the Victorian-style sitting room where the walls and mantle piece are covered in strange paintings and bric-a-brac, the companionship of preparing meals in the shared kitchen and having one’s food snatched by sharp-eyed kookaburras.

“I think that everybody who has been to Warrah would be happy with the council’s zoning decision because Warrah’s special atmosphere will be preserved into the future,” says Prof Overall.

To celebrate, the School will hold its annual alumni function at Warrah on October 22 (see invitation on page 8).

Prof Overall invites all alumni to join the School for a field day and BBQ at Warrah.

“This will be a chance for alumni to come back to Warrah with their friends and families to see the field station and remember the time spent there. We’ll have biology activities for the kids, staff-led tours of the bush and rock platform and a BBQ lunch. Just remember the kookaburras are as hungry as ever.”
ALUMNI PROFILE: DAN LUNNEY

In 1968, when Dan Lunney was in the final year of his Bachelor of Science degree at the University of Sydney, the Student Handbook advised that there were no careers in zoology, except for teaching and research. Forty three years later, Dan is a Senior Principal Research Scientist with the Office of Environment and Heritage, has added an MSc (from the University of Sydney) and a DSc (honoris causa) to his BSc, and includes 29 books among his 200 refereed scientific publications in a long and varied list of achievements. Here, Dan reflects on a successful zoology career that shows no signs of flagging.

The early days
“What I want you to do, is to see what everyone else sees, but think what no-one else has thought before.”

That statement, by Charles Birch, Professor of Zoology, in my first week at the University in 1965, sounded wonderful. It was just the reason I had come to university.

My memory of my undergraduate years was also as much about what happened out of the lecture theatres as inside them. I recall a lunchtime talk on the roots of the ecological crisis by my botany lecturer Roger Carolin, followed by discussions on the impending environmental calamity by zoology lecturer Harry Recher. It was the first time I heard there was an ecological crisis, let alone one that would bring environmental changes of vast proportions. However, that was lunchtime fringe entertainment. There was nothing like it in the courses I attended and no marks were awarded for knowing anything about this matter.

As it turns out, the challenge of opposing values has been ever present in my working life. The clash of values lies in being a biologist promoting the conservation of our unique wildlife and landscapes in the face of the pervasive desire for economic growth.

From student to zoologist
Shortly after I graduated, governments began taking a closer look at the environment and I took a job as an education officer in the brand new NSW National Parks and Wildlife Service. It is now a larger organisation – the Office of Environment and Heritage within the Department of Premier and Cabinet, created in March 2011.

As an education officer from 1970 to 1973, I was faced with many novel questions, such as: “What are the values of National Parks and Nature Reserves?”, “How do you conserve fauna across the entire State?”, “What happens to animals in a bushfire?” and “How does the wildlife survive woodchipping?”

These questions have consumed the rest of my working life, not as an education officer, but as a research scientist. I have relished the research in these difficult subjects because of the scientific training I received here at the university in the 1960s and then again in the 1970s as a part-time Masters student. How to frame a question, how to acknowledge the work that preceded your effort, and how to write in a way that sets down your findings clearly before you venture your conclusion, were all part of the lesson.

Spreading the word
Communicating science, even to colleagues, is hard work. One way is to publish, as well as to help others get into print. I have edited or co-edited books with such titles as A Natural Legacy, Conservation of Australia’s Forest Fauna, Urban Wildlife, Conservation Through Sustainable Use of Wildlife, A Zoological Revolution and The Natural History of Sydney.

Editing these books also exemplifies an important theme of my work, as I came to see that all research occurs in a broader context than just the science, such as an historical context, in particular our society’s values, ethical beliefs and traditions. We ignore this wider context at our peril.

I urge our up-and-coming zoologists to maintain a broad vision, and to heed Charles Birch’s words from so many years ago.
ALUMNI BBQ AT WARRAH

The School of Biological Sciences invites all alumni to a field day and BBQ at Warrah.

Take your friends and family on a trip down memory lane at the Warrah field day and BBQ. Enjoy a family-friendly day revisiting the School’s much-loved field station and rekindling ties with former class-mates. There will be bush walks and trips to the rock platform, led by the School’s resident experts, as well as biology activities set up in the field station’s laboratories. A BBQ lunch will be catered and transport assistance provided. See the School of Biological Sciences’ alumni webpage for more details:

sydney.edu.au/biology/alumni

Saturday 22 October, 2011, all day, from 11am
Warrah, 75 Crystal Ave, Pearl Beach NSW
RSVP: 10 October to biorsvp@sydney.edu.au

MURRAY LECTURE

Synthetic Biology: the next gen of GM

Dr Jim Haseloff, from the University of Cambridge, will explain how the emerging field of Synthetic Biology goes beyond traditional modification of inserting a single gene into an organism, to using engineering principles to design and construct brand new living systems from scratch.

Wednesday 10 August, 5:45pm - 6:45pm
Eastern Ave Auditorium, University of Sydney
RSVP: science.forum@sydney.edu.au
Enjoy a plant display and cocktail reception from 7pm