

LINNEAN SOCIETY OF NEW SOUTH WALES

LINN S'O'C' NEWS

**NEWSLETTER NO: 158**

**DECEMBER 2015**

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**INCLUDED WITH THIS ISSUE**

Membership renewal form  
Minutes of the Annual general Meeting, 18 March 2015

**NEW MEMBER:** We welcome Mr Arjun Verma of the University of Technology. Field of interests: marine microbiology and toxins, seafood safety, harmful algal blooms, biodiversity and biogeography, functional genetics.

**RENEWAL OF MEMBERSHIP**

A form for renewal of membership is included with this newsletter. Please note: you get a discount if you pay before 31 March. If you send a bank transfer, make sure you tell us, or we will receive the money and not know who paid it.

**If you have already renewed your membership for 2016 or are a life member, please disregard this notice**

A CD of the *Proceedings* is available to Members at no extra cost, on request. The form for renewal of membership has a box to tick if you want a CD, or you can contact the office at any time.

The *Proceedings* is published on line and may be accessed free of charge by anyone at the website <http://ojs-prod.library.usyd.edu.au/index.php/LIN>

## **JULIAN TENISON WOODS AWARDS**

The Sisters of Saint Joseph have made a generous donation of \$5,000 to celebrate the 125<sup>th</sup> year of the death of Julian E. Tenison Woods. The Rev Fr Tenison Woods is well known for his work in Catholic Education and he founded the Order of the Sisters of St Joseph, although Mary McKillop made the Order a reality. It was their collaboration that gave Australia a new form of religious life with special care for the underprivileged.

Tenison Woods was also a notable natural philosopher and made very significant contributions as President of the Linnean Society in 1879 and 1880. He published more than 60 papers in the Proceedings of the Linnean Society of NSW. He also contributed to other scientific journals and wrote extensively for the general public.

Two research awards of up to \$2,500 will be made, one each for 2016 and 2017. The Research Grants Committee will choose the best applications that fall within the interests of Tenison Woods from the Betty Mayne and Joyce Vickery applicants. Tenison Woods interests included biogeography, botany, ecology, fisheries, geology, malacology, marine invertebrates, mycology and paleontology.

The Presidential Address at the Annual general Meeting on the 23rd of March will be given by Prof Robert King and will be about Tenison Woods and his contribution to Natural History.

## **APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS**

**Application forms** for all Research Funds may be obtained from the Secretary or the Home Page: <http://linneansocietynsw.org.au>

**Intending applicants** please read instructions carefully and submit your signed application by email to [linnsoc@inet.net.au](mailto:linnsoc@inet.net.au)

**The date for submission of applications for all the funds is 1st March, 2016.**

## **WILLIAM MACLEAY MICROBIOLOGY RESEARCH FUND**

Grants are available from the William Macleay Microbiology Research Fund to support original research in an Australian context within the field of Microbiology.

- Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.
- Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess:

- The quality of the project
- The applicant's ability to carry it out

- A realistic costing and timetable.
- The likelihood that successful completion of the research will lead to publication.

A grant of up to \$2,300 is available to members of the Linnean Society of New South Wales and \$1,200 is available to non-members of the Society.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

Closing date is **1 March 2016**. Submit your signed application by email to [linnsoc@inet.net.au](mailto:linnsoc@inet.net.au)

### **BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES**

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess: the quality of the project; the applicant's ability to carry it out; a realistic costing and timetable; and the likelihood that the successful completion of the research will lead to publication.

Applicants need not be members of the Society, although all other things being equal, members will be given preference.

Individual grants will not normally exceed the level of equivalent awards from the Joyce

W. Vickery Scientific Research Fund, i.e. \$2,500 for Members and \$1,500 for non-members. Money awarded must be used for research purposes, and field work or travel within Australasia. Requests for subsistence, travel to conferences, or thesis preparation expenses, will not be supported.

The Council will take into account other sources of research funds currently held or applied for by the applicant. While financial support from other sources will not ordinarily exclude award of a grant from the Betty Mayne Scientific Research Fund for Earth Sciences, a grant from this Fund cannot be held concurrently with one from the Joyce W. Vickery Scientific Research Fund.

Applications must be made on the form specific to the Betty Mayne Scientific Research Fund for Earth Sciences. Intending applicants are strongly urged to seek assistance from their supervisor or an appropriate colleague with experience in writing research proposals, and further, to have their application reviewed before submission.

Successful applicants are required to make a written report to the Society no later than 12 months from receipt of their grant, detailing progress of the project, briefly outlining research results, and justifying expenditure of the award money. Any publication arising from studies supported by the Betty Mayne Scientific Research Fund for Earth Sciences must acknowledge that support. Type material, representative sample collections, relevant analytical data, and figured or mentioned thin sections, must be lodged in a state or national museum or university collection.

The Council's decision in regard to the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Closing date is **1 March, 2016**. Submit your signed application by email to [linnsoc@inet.net.au](mailto:linnsoc@inet.net.au)

### **THE JOYCE W. VICKERY SCIENTIFIC RESEARCH FUND**

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

- Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.
- Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess:

- Realistic costing and timetable
- The quality of the project
- The applicant's ability to carry it out
- The likelihood that successful completion of the research will lead to publication.

Individual grants will not normally exceed \$2,500 for Members of the Linnean Society of New South Wales and \$1,500 for non-members.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project, and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society. The application may contain no more than three (3) pages of additional information plus references.

The Society's decisions are final and no correspondence will be entered into about the results.

Closing date is **1 March, 2016**. Submit your signed application by email to [linnsoc@inet.net.au](mailto:linnsoc@inet.net.au)

## **THE MOLECULAR ECOLOGY OF PHYTOPLANKTON AND IMPACTS ON SEAFOOD**, a talk by Dr Shauna Murray

The phytoplankton includes numerous species from most of the major groups of Eucaryotes. Ecological interactions between the species are complex and are achieved mainly through chemical mechanisms. Some of these chemicals are toxic and have proved to be a problem for our fisheries and aquaculture industries. Some phytoplankton can lead to harmful algal blooms that result in the death of marine life and the uptake of toxins into sea food. Paralytic shellfish poisoning and ciguata fish poisoning are the two that give us most trouble, but there are at least five others that are toxic. In all, over 100 toxic compounds are known, but not a lot is known about their activity.

These toxins have an impact on a wide range of species: birds, mammals and marine species. They may cause fish kills, but some fish such as the Spanish mackerel tolerate the toxins and accumulate it to levels that can kill people if they eat the fish. Similarly, the shellfish that harbour the paralytic shellfish toxin, tolerate the toxin. The Hitchcock film *The Birds* can be traced back to a real incident where the birds were affected by one of these toxins.

Not all species or all strains are toxic and some strains do not accumulate the toxin.

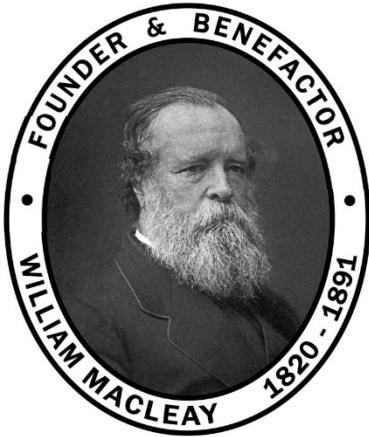
Biotoxins can structure marine ecosystems by disparate effects on different organisms. If copepods at the bottom of the food chain are exposed to toxins, they are less affected when exposed again. Shellfish evolve resistance in response to exposure to the dinoflagellate *Alexandrium*, the producer of paralytic shellfish toxin. Incidents of poisoning have been increasing over the last 40 years. *Alexandrium* may be found in the Sydney Rock oyster. An outbreak of *Amphidinium* in Curl Curl Lagoon killed off the eels but it is considered relatively benign to humans.

Studying the toxins and the organisms that produce them has problems since they are all single cells and can only be seen down the microscope. Morphologically, one species may differ from another only in a pore or two and the ability to form chains. Another approach is to study the genetics. These phytoplankton species are Eucaryotes ("higher" plants and animals) and have many more genes than the Procaryotes (bacteria) and belong to many different taxonomic groups.

The genetics are used to trace the evolution of the toxicity genome and show that the genes involved come from other species. Lateral transfer of genes from one species to another is well known for bacteria and it also happens in the the phytoplankton. Dinoflagellates can steal plastids from other organisms and transfer genes from one organelle to another. A series of genes are necessary to produce the toxin and the non-virulent strains may lack a gene or two or have an inactive form. The genetic history of the synthesis of saxitoxin, the paralytic shellfish toxin can be traced back more than 2,100 million years to a cluster of cyanobacteria species (blue-green algae). The gene cluster has been conserved through selection, rearrangement, recombination and duplication to function as a neurotoxin today.

Several hypotheses exist as to the likely ecophysiological role of saxitoxin: a chemical defense method, cellular nitrogen storage, DNA metabolism, or chemical signaling. That the machinery for saxitoxin production has been conserved all this time under radically changing environmental conditions shows it continues to play some important adaptive role in the cyanobacteria.

A large on-going project to fully sequence the genomes of the phytoplankton aims to illuminate the ecophysiological interactions in the marine environment. These small, invisible to the naked eye organisms face the same ecological problems that are seen in ecosystems anywhere else. They solve these problems mainly through chemical means. The dinoflagellate *Alexandrium*, responsible for the paralytic shellfish toxin has somehow acquired the genetic mechanism to produce the toxin from the blue-green algae.



**THE LINNEAN SOCIETY  
OF NEW SOUTH WALES**

2016 Annual General Meeting

The 141<sup>st</sup> Annual General Meeting of the Society will be held at 18:00 on 23 March 2016 in the Classroom in Anderson Building, Royal Botanic Gardens, Mrs Macquaries Road, Sydney.

Members and guests are invited to join the Council of the Society for wine and light refreshments from 17:30.

Five members of Council are due to retire at this AGM:

Michael Augee  
Emma Gorrod  
Robert King

Helene Martin  
Bruce Welch

and four offer themselves for re-election. Dr Augee decided to retire from Council.

Council recommends the election of Dr Michele Cotton as President of the Society for 2016.

Council recommends that the current auditors, Phil Williams Carbonara, be retained for 2016.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor. Nominees must be financial Ordinary Members (a category which includes Life Members) of the Society. The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

***Nominations must be received by the Secretary at the Society's offices at 3/40 Gardeners Road, Kingsford (PO Box 82, Kingsford 2032) by 31 January 2016.***