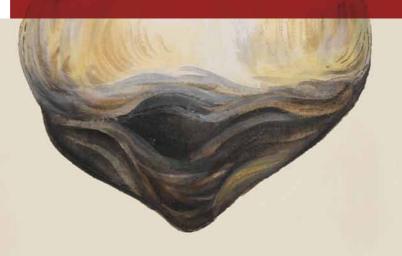




THE BOTANY FOUNDATION ANNUAL REPORT 2015



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Cover photo: *Amanita ochrophylla* by M. Howie (1900-1936); From "Botanical Illustrations to Research" – an exhibition of watercolours from the University of Melbourne Herbarium

THE BOTANY FOUNDATION

The University of Melbourne Botany Foundation supporting the discipline of Botany in the School of BioSciences.

The Foundation supports excellence in education and research in botany – the study of plants and plant processes.

All life depends on plants. People use plants for food, fibre, fuel and medicines. Plants and algae are the producer organisms of ecosystems and absorb carbon dioxide, mitigating climate change. Beneficial fungi are essential for ecosystem functions by recycling material; others cause disease.

The Foundation has established an endowment for student scholarships and awards, an eminent professorial chair, a research fellowship, and specific research funds, all of which are key to securing outcomes in plant science for the long-term benefit of Australia.

A brief history

The Foundation was established in 1994 following approval by The University of Melbourne Council of "an appeal to create a fund for the encouragement and promotion of excellence in education, study, teaching and research in botany, to be called 'The University of Melbourne School of Botany Foundation', within the responsibility of the faculty".

In 2015, following a University restructure and amalgamation of the School of Botany with the departments of Genetics and Zoology, the Council

approved a name change to the Foundation to "The University of Melbourne Botany Foundation" to "support the discipline of Botany within the new School of BioSciences". The intent of the Foundation was unchanged.

Over the last 20 years the Foundation has raised funds through various events, with generous donations and bequests from alumni and supporters. The funds (capital sums and income) are invested through the University's Long Term Investment Fund and tied to specific purposes; these tied funds are managed as separate sub-trusts within the Foundation.

As at 2015, the Foundation Trust includes 10 endowed student awards, an endowed research fellowship (with a matching endowment as a partnership with the Royal Botanic Gardens Victoria), and four funds to support specific areas of botanical research. The University Trust Regulation (UTR 7.189) sets out the background to each of these awards or funds. "Unrestricted Funds" provide a valuable and flexible source of money to support postgraduate international and national travel and to seed research projects that are likely to secure external grants.

In 2007, endowment funds raised through the Foundation for the Adrienne Clarke Chair of Botany were transferred to a separate Trust account governed by The University Trust Regulation (UTR 7.241).

REPORT FROM THE FOUNDATION

BOARD CHAIRMAN

The Botany Foundation Board continues to be active and met regularly in 2015 to manage the distribution of earnings for the continued support of botany students and researchers.

I am pleased to report that this year the Foundation supported 13 third-year, honours and postgraduate students through prizes and scholarships; and 14 postgraduate students to travel abroad for their research and to participate in conferences.

Support for research continued through the Adrienne Clarke Chair of Botany, which supports Professor Mark Burgman FAA, Director of the Centre of Excellence in Biosecurity Risk Analysis (CEBRA); and through our partnership with the Royal Botanic Gardens with the endowment of the Pauline Ladiges Research Fellowship in Plant Systematics.

We were pleased to partner with the Baillieu Library, with support from the Russell and Mab Grimwade Miegunyah Fund, for the exhibition "From Botanical Illustrations to Research" – featuring a collection of watercolours of fungi by the late Malcolm Howie, rare botanical books, and a series of public lectures. The Botany Foundation also initiated a public lecture by Dr Cary Fowler, supported through the Crawford Fund, on "Facing the uncomfortable challenge of food security."

A new initiative

A new initiative for 2016 (see p.18) is to establish a fund to support the University of Melbourne Herbarium, within the School of BioSciences. The Herbarium holds significant reference collections of plants that are integral to the science of plant systematics and taxonomy. The University Herbarium compliments the activities and collections held in the State Herbarium, Royal Botanic Gardens Melbourne, with which we collaborate. Our Herbarium is unique in being able to support student training and research, with many of the staff in Australia's herbaria having been trained over the years through Melbourne.

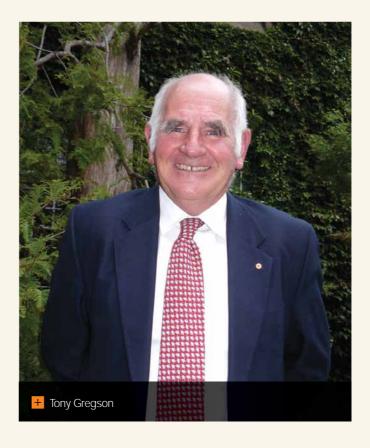
The Herbarium is currently digitising the collection (c. 15% so far completed) and recording data associated with each specimen to allow electronic, remote access by users of biodiversity information. Demand for information is high from ecologists and conservation and ecosystem managers.

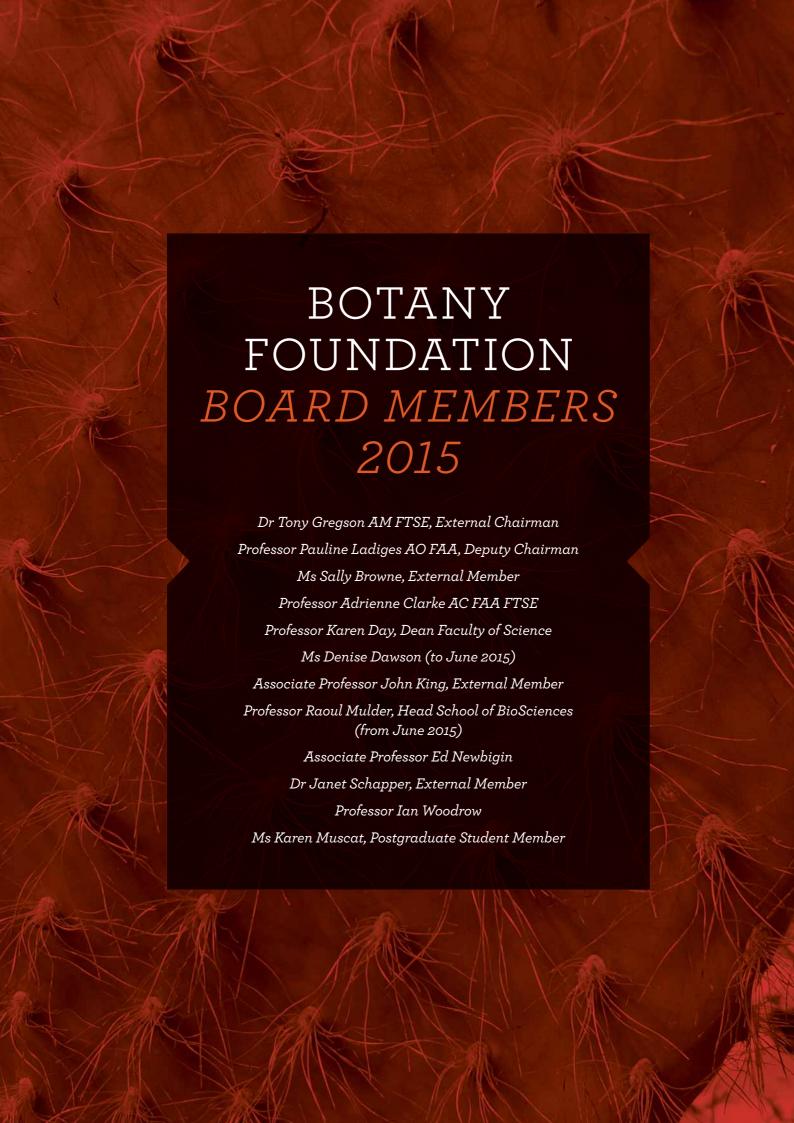
The herbarium also aims to provide web-access to plants of regions in Victoria as a service to the broader community.

The Botany Foundation aims to support the Herbarium by establishing a new sub-trust and welcomes your donation towards this new initiative.

Tay aregon

Dr Tony Gregson AM FTSE Chairman, Botany Foundation

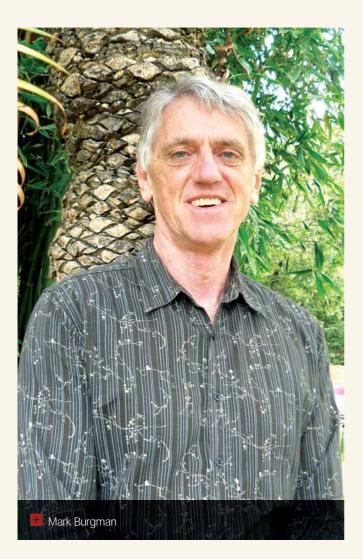




SUPPORTING RESEARCH

THE ADRIENNE CLARKE CHAIR OF BOTANY: SECURING A PROFESSORIAL POSITION FOR THE FUTURE

The endowed Adrienne Clarke Chair of Botany (currently valued at \$3.1 million) is held by Professor Mark Burgman FAA. He is currently Director of the Centre of Excellence for Biosecurity Risk Analysis.



His Centre (CEBRA) works with both the Australian Government and New Zealand Department of Primary Industry to develop new methods, protocols and tools for biosecurity risk analysis.

Professor Burgman has received research grants from the Australian Research Council, government agencies, industry and private foundations. He has published five authored books, including *Trusting judgements: how to get the best out of experts*, which appeared through Cambridge University Press in 2015, two edited books, over 170 research papers, and more than 50 reviewed reports and commentaries.

Burgman works on ecological modelling, conservation biology, biosecurity and risk assessment. He and his colleagues are developing quantitative methods to solve environmental problems. Emphasis is on surveillance systems, consequence assessment, expert judgement, stochastic population models, statistical habitat models and decision support tools. His research has included models of a broad range of species in a range of settings including marine fisheries, forestry, irrigation, electrical power utilities, mining, and national park planning.

He was the winner of the 2005 Eureka Prize for Biodiversity Research and the winner of the 2013 Royal Society of Victoria Research Prize for Biological Sciences. He is an elected Fellow of the Australian Academy of Science. He is Editor-in-Chief for the journal *Biological Conservation*.

Burgman has mentored many students and postdoctoral fellows. In 2015, one of his past postgraduate students, Dr Jane Elith, currently on the staff of the School of BioSciences, received the Prime Minister's Frank Fenner Prize for Life Scientist of the Year.



ENDOWED RESEARCH FELLOWSHIP IN BIODIVERSITY SCIENCE

Generous donations have endowed the Pauline Ladiges Plant Systematics Research Fellowship. Our sub-trust (with a current value of \$1.1 million) is matched by a similar endowment at the Royal Botanic Gardens, Victoria, fostering joint research between the National Herbarium of Victoria and the University.

Through this fellowship, research is leading to greater knowledge of Australia's plant biodiversity, which underpins species conservation and applied plant science.

The inaugural fellow is Dr Tanja Schuster, who has completed two years of her fellowship. She has attracted two significant research grants that support both laboratory and field work.

Tanja is researching two important plant groups – the buckwheat family, Polygonaceae, which includes invasive weeds, and the eucalypts. She and her colleagues are sequencing the genome of various species of eucalypts using new molecular technology including analysis of whole genomes. Her results are informing phylogenetic (evolutionary) relationships among different lineages of eucalypts and hence solving controversial issues of classification and taxonomy. The genomic work has the potential to discover genes that relate to adaptation of the eucalypts to the Australian environment. Such knowledge has applications in forest science and in predicting plant responses to climate change.



TROPICAL RAINFOREST LEGUMES TAXONOMY, BIOGEOGRAPHY AND CONSERVATION

In 2015, the Botany Foundation provided a small grant to support the research of Dr Gillian Brown, Melbourne University Herbarium Curator.



This funding provided Gillian with technical assistance to extend her current project on the "Evolution and taxonomy of the tropical rainforest genus *Archidendron*", augmenting funding from an Australian Pacific Science Foundation gran

Why is *Archidendron* important?

Archidendron is the largest group of Old World legumes in the tribe Ingeae (family Leguminosae; Mimosoideae) occurring in Australian, New Guinean, and SE Asian lowland rainforests. It includes 94 species, with at least 22 listed as imperfectly known. Species are grouped into eight taxonomic series but this classification is in need of critical revision.

Understanding the genetic diversity and relationships (phylogeny) within this genus will not only result in an improved taxonomic treatment but will provide invaluable information on phylogeographic patterns in eastern Australian rainforests, which are not well documented for the flora. Awareness of historical biogeographic patterns has implications for management and conservation of plant diversity in the broader SE Asian, Australian and Pacific region, including the Australian World Heritage Wet Tropics.

The Foundation's funding is supporting one objective of Gillian's research: to assess the genetic variation,

using DNA sequencing, within *A. hendersonii*, which in conservation terms is considered to be a "vulnerable species". This rainforest tree shows considerable variation in flower size and a notable disjunct distribution between Northern Queensland to New South Wales. Preliminary DNA data indicate geographic genetic variation and that *A. hendersonii* appears to consist of more than one species, with all forms /species requiring conservation.



SUPPORTING STUDENTS

SCHOLARSHIPS AND PRIZES IN BOTANY

The Foundation's endowed scholarships allow students to achieve their potential for the future of Australia. Prizes recognise their excellence and achievements. Each award is governed by the Foundation's University Trust Regulation, and eligibility criteria relate to the wishes of the original donors.

Student research is contributing to: our understanding of how plants function, finding better ways to control fungal diseases of crops, controlling weeds, how to use fire in managing ecosystems, understanding the cell biology of the malaria parasite, developing iron-biofortified wheat, and discovering new species.

Thirteen students recognised in 2015

Forty students applied for awards this year and the successful recipients included: nine PhD students, two Masters students, one Honours student and one Postgraduate Diploma student. The awardees were:



Botany Prize for 2015 Megan Rixon

Megan Klemm
Postgraduate
Research Award
Catherine Clowes and
Claire Sayers

John S. Turner
Postgraduate Scholarship
Edgar Zhipeng Lui and
Samiddhi Lankani Senaratne

David H Ashton Scholarship Freya Thomas and Els Van Burm

Ethel McLennan Award
Jesse Beasley

Gretna Weste Plant

Scholarship

Andrew Urquhart

Pathology and Mycology

David Ashton Travel Award Estibaliz Palma

Kinglsey Rowan Marine Botany Prize Oakley Germech Sophie Ducker Postgraduate Scholarship Rachael Fowler

G.A.M. Scott Research Award Zoe Stevens







DONATION SUPPORTS POSTGRADUATE RESEARCH OF ENVIRONMENTAL BENEFIT

The Lifework Foundation provided a donation to be allocated between scholarships for the disadvantaged in general and postgraduate scientific research into renewable energy and other areas of environmental benefit.

The Trustees of the Lifework Foundation approved an allocation of \$10,000 from the donation to be added to the capital of the Ethel Mclennan Award in the Botany Foundation to increase its value to a student; this award supports disadvantaged botany students. The balance of the donation supported the research of one PhD and one Masters student.

RESTORING A WET LAND

- Saras Windecker

The aim of Saras' PhD research is to determine how the composition of plant functional traits in a wetland impact ecosystem function, and how these relationships might inform restoration.

Wetlands are some of the most productive ecosystems on earth and provide valuable ecosystem services such as water filtration, flood mitigation, carbon sequestration and biodiversity habitat.

The Lifework Foundation funding will contribute to set-up costs of a mesocosm experiment on wetland plants to test the relationship between plant functional trait composition and the ecosystem function of water infiltration. This research will contribute to the larger conversation about the relevance of trait information for informing how to restore wetlands to maximise function.

Saras' hypothesis is that plants impact water infiltration by physically slowing down surface runoff, intercepting rainfall as through-fall, taking up water in the soil, and increasing water-retention capacity of the soil. She will test the contribution of plant traits such as stem rigidity, root complexity, and leaf surface area in relation to these mechanisms.



FIRE MANAGEMENT IN ARNHEM LAND

— Finley Roberts

The Arnhem Plateau, Northern Territory, is an area of high biodiversity value and species endemism. It is also a highly flammable landscape, driven by the abundance of grassy fuels and seasonal monsoons.

Prescribed burning is undertaken to reduce the impact of large, late dry season wildfires on biodiversity, as well as to generate carbon credits. However, it is unclear whether there are trade-offs between maximising the amount of carbon credits generated and conserving small mammal species and fire sensitive vegetation communities.

For carbon credit generation, fire management emphasises burning a large proportion of the landscape early in the dry season to prevent late dry season fires that release significantly more greenhouse gas emissions. However, some vegetation communities require five years or more between fires to reach reproductive maturity, and for them, it may be beneficial to reduce the frequency of fires. The fire sensitive vegetation communities that Finley is researching are *Allosyncarpia ternata* closed forest, *Callitris intratropica* groves and Sandstone Heath.

Finley's Master's project aims to assess the trade-offs in different fire management strategies by predicting how small mammal species and fire sensitive vegetation types would respond to five alternative burning scenarios.

The Lifework funding will enable Finley to travel to the Northern Territory for fieldwork. He will conduct face-to-face interviews with fire ecology experts and discuss his proposed alternative scenarios with the land managers of the study area. Through this fieldwork he will gain a much better understanding of how fire management is conducted. Finley will then identify gaps in scientific understanding, thereby informing models of fire regimes and enabling better fire management.



POSTGRADUATE TRAVEL SCHOLARSHIPS

The Botany Foundation provided a number of travel scholarships up to \$1000 each to match funds provided through the School of BioSciences.

These funds support students to attend international or national scientific conferences and research laboratories where they meet the leaders in their fields and have a chance to present their own research work.

Awards were provided to:

Dhika Amanda

26th International Conference on Arabidopsis Research, Paris

Manisha Bardwaj

2015 International Conference on Ecology and Transportation, Raleigh, North Carolina

Joanna Costa

European Phycological Conference, London

Mahmud Hassan

Synthetic Biology Conference, London

Christopher Kersten

Laboratory visits, Zurich and Berlin

Edgar Lui

26th International Conference on Arabidopsis Research, Paris

Todd McLay

Botanical Society of America Conference, Alberta Canada, and laboratory visits, Philadelphia and Wisconsin

Karen Muscat

Australasian Systematic Botany Society Conference, Canberra

Esti Palma

Ecology and Alien Plant Invasions Conference, Hawaii

Hannah Pearson

Ecological Society of Australia Annual Conference, Adelaide

Nadira Samad

13th International Toxoplasmosis Conference Gettysburg, Pennsylvania.

Claire Sayers

Gordon Research Conference on Organellar Channels, Waltham Massachusetts

Samiddhi Senaratne

Phytochemical Society of North America, Urbana-Champaign Illinois

Tahir Udin

Molecular Parasitology Conference, Woods Hole Massachusetts

COMMUNITY *ENGAGEMENT*

THE MELBOURNE POLLEN COUNT - A FREE SERVICE FOR ALLERGY SUFFERERS

The Melbourne Pollen Count Service provides a daily count and weekly forecast of grass pollen in Melbourne's air from October to December to support hay fever and asthma sufferers.

In 2015 this service was supported by the School of BioSciences and donations to the Foundation. It was organised by Associate Professor Ed Newbigin, who trains 'counters' to record the pollen load during the season. This year Ed promoted the pollen count to the media through the ABC (Gippsland and Albany), the Saturday Age and evening news.

Since establishing the Melbourne Pollen Count a number of years ago through the Botany Foundation, there are now three more capital cities involved in providing a service – Canberra, Sydney and Brisbane. The four capital city pollen counts are coordinated through the Australian Pollen Allergen Partnership (APAP), which aims to establish a national pollenmonitoring program. Research Fellow Dr Edwin Lampugnani has set up websites and associated social media for the four pollen count sites.

Forecasting 'bad days'

The information provided by the program has the potential to reduce the social, medical and financial burden of seasonal allergic respiratory disease. Otherwise known as seasonal allergic rhinitis, hayfever affects about 15 per cent of Australians. The main culprit is grass pollen, particularly rye grass for those living in Melbourne. The pollen count helps sufferers be able to identify days when the pollen in the air is high, giving a short term forecast of what the likely conditions will be in the next one to seven days.

How to measure pollen in the air

For more than 20 years, a Burkard volumetric air sampler has been housed on the roof of Melbourne University's Earth Sciences building. Built in the 1980s, it draws in air like a vacuum cleaner, capturing pollen and other particles on a sticky glass slide. Trained botanists can identify the type of pollen and count the number of grains on the slide.



Web addresses for the capital city pollen counts

- melbournepollen.com.au
- canberrapollen.com.au
- sydneypollen.com.au
- brisbanepollen.com.au
- The APAP: www.australianpollen.com.au

FROM BOTANICAL ILLUSTRATIONS TO RESEARCH — AN EXHIBITION OF WATERCOLOURS FROM THE UNIVERSITY OF MELBOURNE HERBARIUM



+ Fungi painting of the late Malcolm Howie



A highly successful exhibition centred on the art and science of fungi was held from late March to late June, 2015 in the Noel Shaw Gallery, Baillieu library. On display were 40 original watercolours of native fungi held in the University of Melbourne Herbarium that were painted by the late Malcolm Howie (1900-1936).

In addition to these paintings, specimens from the University Herbarium were on display in glass cabinets, along with historic botanical books from the Library's Special Collection and from MELU.

The exhibition was organised as a partnership between the Herbarium and the Baillieu library, whose staff provided professional design, printing and curation. Support was received also from a Russell and Mab Grimwade Miegunyah Fund Grant and the Botany Foundation. In kind assistance included the loan of exhibition frames from the Potter Gallery and discounted mount supply from Leo Scott Picture Framing, Eltham.

Botany alumnus, Dr Tom May (Senior Mycologist at the Roya Botanic Gardens Victoria) was guest speaker at the opening on 26 March. A series of talks related to the exhibition was given to packed audiences throughout the period of the exhibition, attracting the general public and botany alumni.

For more information visit http://library.unimelb.edu.au/ botanicalillustrations

FOUNDATION FINANCIAL SUMMARY 2015

	Balance at 01.01.2015	Income	Awards & Expenses	Revaluation	Balance at 31.12.2015
Adrienne Clarke Chair of Botany Trust	3,056,851	124,151	-71,263	71,691	3,181,430
Botany Foundation Trust					
Unrestricted Funds	1.245,208	56,535	-52,834	23,968	1,272,877
David Ashton Travel Award	39,209	2,595	-1,040	961	41,724
David H Ashton Scholarship	111,578	4,659	-4,104	2,341	114,473
Sophie Ducker Postgraduate Scholarship	63,339	2,909	-1,859	1,328	65,717
Megan Klemm Research Award	92,231	8,496	-2,488	1,957	100,197
Bruce Knox Prize	37,479	1,379	-1,035	775	38,599
Pauline Ladiges Plant Systematics Research Fellowship	1,087,387	50,708	-40,080	20,145	1,118,160
Ethel McLennan Award	43,756	11.979	-1,645	923	55,013
Plant Systematics Research Fund	227,777	13,207	-5,203	4,321	240,102
Protist Systematic Research Fund	36,400	3,797	-33	541	40,705
Kingsley Rowan Marine Botany Prize	21,310	997	-720	452	22,040
G.A.M. Scott Research Fund	120,217	4,172	-2,102	1,465	123,753
John S. Turner Postgraduate Scholarship	73,207	3.508	-2,770	1,576	75,522
Gretna Weste Plant Pathology & Mycology Scholarship	34,173	1,288	-1,032	735	35,163
Fern Research Fund	14,023	10,312	-8	0	24,326
V Sarafis Research Fund		10,561	-4		10,556
Botany Foundation Trust - Total	3,247,294	187,103	-116,956	61,486	3,378,927
Total of the Two Trusts	6,304,144	311,254	-188,219	133,177	6,560,357

NOTES

Income includes donations and earnings on investments

Expenses include administration charges

Revaluation amounts represent the change in unit price of the capital units during 2015 of respective Trusts

Unrestricted Funds support research initiatives, events and postgraduate travel awards

DONATIONS 2015

Adrienne Clarke Chair of Botany Clarke, Adrienne

David H. Ashton Scholarship Costermans, Leon

David Ashton Travel Award Schapper, Janet

Ethel McLennan Award
Donald Gaff
Lifework Foundation

G.A.M. Scott Research Fund Bryony Macmillan

John S. Turner
Postgraduate Scholarship
Anonymous (2)
Groves, Richard & Margaret

Melbourne Pollen Count
Anonymous
Michael Lean
Bojan Pajic

Megan Klemm Research Award Anonymous

Pauline Ladiges Plant Systematics Research Fellowship

Costermans, Leon
Gregson, Tony
Ladiges, Pauline
Little, Brian
Morgan, Susan
Moors, Philip
Playford, Mary
Quinn, Julie Anne
Richards, Max & Margaret
Steinicke, Jennifer
Watts, Cassie

Plant Systematics Research Fund

Adams, Peter & Lawson, Sheryl Everson, Robert Kenrick, Josephine Ladiges, Pauline Nelson, Gareth Royalties, Pearson Australia

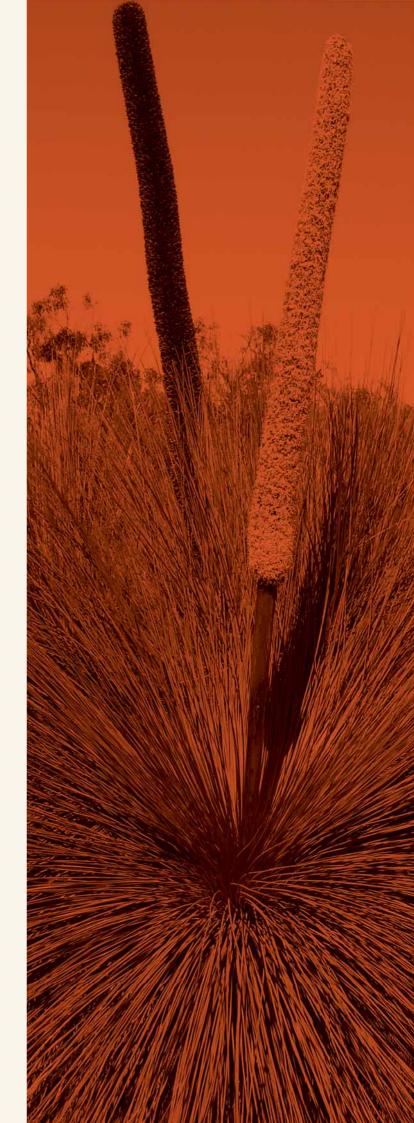
Protist Systematics Research Fund Cowan, Roberta

Unrestricted

Sophie Ducker Postgraduate Scholarship Anonymous Flesch, Juliet

(including donations to Melbourne Pollen Count) Anderson, John Anonymous (2) Clifford, Trevor & Gillian Duncan, David Gregory, Lee Lifework Foundation

V Sarafis Research Fund Instalment from V Sarafis Bequest



LOOKING AHEAD

In the coming year, the Botany Foundation will continue to work towards its main objectives.

- The Foundation has an on-going commitment to increasing the corpus and thus the value of annual awards to students, who represent the future.
- The Foundation welcomes further donations to lift the capital base of the prestigious Adrienne Clarke Chair to fully fund a professorial position. The Trust has a current value of \$3.1 million.
- A new initiative for 2016 is to establish a fund for the University of Melbourne Herbarium. In late 2015 the School of BioSciences received a bequest, half of which is for "the research into the classification of plants".
 The funds are able to be used to set-up a research fund to support the University of Melbourne Herbarium into the future. The Foundation has committed to a fund-raising campaign to grow this fund to a significant endowment.

The University Herbarium was established in 1926 and is now the largest university herbarium in Australia,

with an estimated 150,000 specimens. The herbarium includes modern collections of plants, algae and fungi, type specimens and historically significant specimens such as those collected by Banks and Solander, as well as historic botanical objects and artwork.

The Herbarium plant collection is a focus for taxonomic research by staff and students; it is part of the network of Australia's registered herbaria, which provide online access to their plant collections as data bases that underpin biodiversity conservation. With the global concern surrounding environmental change and loss of biodiversity (impacting agriculture, food security, habitat and species conservation), the imperative to maintain active research herbaria is recognised Australia-wide. Our university herbarium, which has the unique capacity to train students, complements the National Herbarium of Victoria at the Royal Botanic Gardens (RBG), with which there is a strong collaboration.









FOR FURTHER **ENQUIRIES**

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