

PROCEEDINGS

AND

TRANSACTIONS

OF

THE ROYAL SOCIETY OF VICTORIA

Volume 125 NUMBER 1/2 Published by the Royal Society of Victoria ABN 62 145 872 663 9 Victoria St Melbourne, Victoria 3000, Australia

Tel.: +61 3 9663 5259 Fax: +61 3 9663 2301

Email: rsv@sciencevictoria.org.au Web: www.sciencevictoria.org.au

Printed by BPA Print Group

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Royal Society of Victoria.

ISSN 0035-9211

© The Royal Society of Victoria Incorporated, 2013

THE ROYAL SOCIETY OF VICTORIA 2013

Patron The Hon Alex Chernov Ac, Qc, Governor Of Victoria

President DR W.D. BIRCH AM, BSC(HONS), PHD

Vice-President Professor P.Y. Ladiges Ao, Faa, Phd, Msc, Diped

Immediate Past PresidentPROFESSOR L. SELWOOD, Msc, PhDHonorary SecretaryDR M. WILLIAMS, Bsc, Msc, PhD

Honorary Treasurer Mr N.P. Kennedy, Beng(Commun), Msc(Comp)
Honorary Librarian Dr T.A. Darragh, Msc, Phd, Grad Diped
Honorary Editor Dr M. Familari, Bsc(Hons), Phd, Diped

Honorary Archivist MR M.A.C. CARKEEK, BA

Honorary Research Secretary Professor S.M. Rees, Bsc(Hons), Msc, Mphil, Phd, Dsc

The above Office bearers are ex officio members of the Council of the Society.

Other members of the Council are:

DR M.J. ACKLAND, MBBS, MPH FAFPHM

PROFESSOR G.D. BURROWS AO, CJCJ, BSC, MB, CHB, DPM, MD, FRANZCP, RCPSYCH, MRACMA, DIPMHLTHSC(CLINHYP), FACHAM, DSC

DR D.M. CHURCHILL, BSC, MA, IPAA, PHD

MRS H.J. GARDINER, BA, CERTIV WORKPLACE TRAINING

DR D. LIGHTFOOT, DIPMECHLABTECH, MSC, PHD,

LT COL R.M. LIGHTFOOT, (RETD.), LLB, LLM, DIPCIVENG, DIPELECENG, DIPMECHENG,

BEMINING (HONS), RFD, FIEAUST

MR. J.S. LINK, MECHENGDIP

Professor J.F. Lovering Ao, Faa, Ftse, Fgsaus, Fgsamerica, Frsv

DR J.L. MCBRIDE, BSC(HONS), DIPMETEOR, MSC, PHD

DR P.G. THORNE, BSC, PHD, DIPPUBPOL, HONDENG(MELB), FACS

Executive Officer
Dr J. De Araugo, Bsc, Edd

Honorary Auditor Mr. J.D. Madgwick, Bbus, Aca

Trustees Dr D.M. Churchill, Bsc, Ma, Ipaa, Phd

DR A.S. FINKEL AM, PHD, FTSE

EMERITUS PROFESSOR T.F. SMITH AM, FTSE, BSC(HONS), PHD,

FAIP, FINST PHYS

Professor J.W. Warren, Ma, Phd

EDITORIAL POLICY

The Royal Society of Victoria disseminates new scientific knowledge and encourages scientific debate through the medium of its international journal, *Proceedings of the Royal Society of Victoria*, in which peer-reviewed original research articles, review articles, and short communications in all areas of science; and articles for the Transactions section of our journal that undergo editorial review are published.

The 'Proceedings' consists of papers that are reviewed by two reviewers and, in the cases of widely divergent reviewer opinions, a third reviewer may be consulted. The editor's decision, through the Editorial Committee, as to the acceptance or rejection of a submitted or reviewed contribution, is final.

The 'Transactions' consists of items of scientific interest such as occasional addresses, articles of debate or discussion or other contributions deemed appropriate by the editor and in the scientific interest of our members. The responsibility of the content of such contributions rests solely with the author.

The Society invites contributions for the Proceedings from authors across the various disciplines of science and on issues concerning technology and the applied sciences.

Honorary Editor: Mary Familari Managing Editor: Natalie Korszniak

LIST OF REFEREES

The Editors thank the following referees:

Professor Ray Cas, Geosciences, Faculty of Science, Monash University
Dr Tim Cavagnaro, Monash Soil Ecology Group, Monash University
Professor David Karoly, School of Earth Sciences, University of Melbourne
Professor John Martin, Centre for Sustainable Regional Communities, La Trobe University
Professor Barbara Norman, Urban and Regional Planning, University of Canberra
Dr Digby Race, Ecosystem Sciences, CSIRO
Dr Saman Seneweera, Dept.Agriculture and Food Systems, University of Melbourne
Dr Mark Stafford Smith, Climate Adaptation Flagship, CSIRO
Dr Lin Sutherland, Research and Collections, Australian Museum
Dr Penny Whetton, Climate Impact and Risk, Marine and Atmospheric Research, CSIRO

CONTENTS OF VOLUME 125, NUMBER 1

PROCEEDINGS OF THE CLIMATE CHANGE SCIENCE: IMPACTS AND ADAPTATION FOR VICTORIA PUBLIC LECTURE (20 SEPTEMBER 2012) AND SYMPOSIUM (21–22 SEPTEMBER 2013)

MARK WILLIAMS Summary of the Public Lecture Addressing the Myths of Climate Change, 20 September 2012, and the Symposium Climate Change Science: Impacts and Adaptation for Victoria, 21–22 September 2012	1
PUBLIC LECTURE WILL STEFFEN The myths of climate change-science	2
LESLEY HUGHES & WILL STEFFEN Climate change in Victoria: trends, predictions and impacts	:
JON BARNETT Three myths about adaptation: limits, barriers, and the meaning of life	14
SESSION 1: THE PHYSICAL SCIENCE OF CLIMATE CHANGE KARL BRAGANZA, BLAIR TREWIN, ROBERT SMALLEY & ROBERT FAWCETT Climate observations	1:
SCOTT B. POWER Why does Victoria's climate vary from year to year and from generation to generation?	16
Penny Whetton Climate change projections	17
LISA ALEXANDER Is the climate becoming 'more extreme'?	18
SESSION 2: CLIMATE CHANGE IMPACTS ON VICTORIA ROSLYN M. GLEADOW Summary of Session 2: Climate change impacts on Victoria	19
Dasarath Jayasuriya Cities and water	22
Grant Blashki Impacts on health	23
Leanne Webb Impacts on agriculture	24
Kathleen L. Mcinnes Sea level rise and coastal inundation	31

SESSION 3: CLIMATE CHANGE ADAPTATION FOR VICTORIA MARK WILLIAMS & ROD KEENAN	
Summary of Session 3: Climate change adaptation for Victoria	32
Lauren Rickards Climate change adaptation and scenario planning: framing issues and tools	34
Hartmut Fünfgeld Framing the challenge of climate change adaptation for Victorian local governments.	45
KATE AUTY What we have learnt from Victorian Aboriginal people in our climate change adaptation work	56
Ross Garnaut, AO An overview of current policy arrangements in response to climate change	57
CONTENTS OF VOLUME 125, NUMBER 2	
PROCEEDINGS RAFIKA ISMAIL, DAVID PHILLIPS & WILLIAM D. BIRCH 40Ar/39Ar dating of alkali feldspar megacrysts from selected young volcanoes of the Newer Volcanic Province, Victoria	59
TRANSACTIONS	
FINALISTS FOR THE ROYAL SOCIETY OF VICTORIA 2013 YOUNG SCIENTIST RESEARCH PRIZES *Winners 2013 Young Scientist Student Research Prize	70
Biological Sciences (non-human) Katrin Hug*, Matthew B. Stott, William A. Maher, Frank Krikowa, Simon Foster & John W. Moreau Microbial arsenic resistance in Champagne Pool, New Zealand	71
Niharika Sharma Exploring <i>Marchantia</i> transcriptome to identify genes contributing to sexual reproduction using mRNA-SEQ	72
Biomedical & Health Sciences Katie Ardipradja, Shinn-Dee Yeoh, Uwe Ackerman, Graeme O'keefe, Karlheinz Peter, David W. Howells & Christoph E. Hagemeyer Imaging vulnerable atherosclerotic plaques with radiolabelled single chain antibodies	73
Annie K. Mcauley*, Jie Jin Wang, Paul P. Connell, Mohamed Dirani, Helena Liang, Ecosse Lamoureux & Alex W. Hewitt Novel proteomic biomarkers in diabetic retinopathy	74

CONTENTS OF VOLUME 125, NUMBER 2 continued

Physical Sciences	
Hua Zhou* & Hongxia Wang	
Super durable, robust super hydrophobic fabrics	75
Liyu Jin, Patrick C. Howlett, Jennifer M. Pringle & Maria Forsyth	
Plastic crystals for future batteries	76
WINNER OF THE ROYAL SOCIETY OF VICTORIA RESEARCH MEDAL—	
PHYSICAL SCIENCES CATEGORY	
Frank Caruso	
Engineering particles for therapeutic delivery: Prospects and challenges	77
WINNER OF THE DR PHILLIP LAW AC, POST-DOCTORAL AWARD FOR THE	
PHYSICAL SCIENCES	
Marcus J. Kitchen	
X-Ray specks: Seeing the lungs in a new light	82

PROCEEDINGS AND TRANSACTIONS

OF

THE ROYAL SOCIETY OF VICTORIA

Volume 125 NUMBER 2