Curriculum Vitae

Graham Douglas FARQUHAR AO, FAA, FRS, NAS

Research School of Biology
College of Science
Australian National University

Address: 702 Burra Road
Burra NSW 2620

Date of Birth: 8 December 1947

Academic Qualifications

1968	BSc Australian National University
1969	BSc University of Queensland Honours in Biophysics
1973	PhD Australian National University - Supervisors: IR Cowan and RO Slatyer
2006	Doctor Honoris Causa, Universiteit Antwerpen
2013	Doctor Honoris Causa, University of Wageningen

Academic Awards and Distinctions

1968	Biophysics Scholarship
1970 -73	Commonwealth Post-graduate Scholarship
1980	P.L. Goldacre Award from the Australian Society of Plant Physiologists
1981	Senior Scientist Award under the Japan/Australia Science and Technology Agreement for collaborative research at RIKEN
1982	Australian American Educational Foundation (FULBRIGHT) Senior Scientist Fellowship for research at Carnegie Institution of Washington, Stanford
1983	Gottschalk Medal from the Australian Academy of Science
1984	British Council Academic Links and Interchange Scheme Award
1986	Australia - Royal Society Exchange Award
1987	Bourse de haut niveau du Ministère de la Recherche et de l'Enseignement Superieur de France
1988	Elected to Fellowship of the Australian Academy of Science
1991	Elected to Corresponding Membership of the American Society of Plant Physiologists
1991	CSIRO Medal for research achievement
1995	Elected to Fellowship of Royal Society (of London)
2001	Leading Australian Citation Laureate
2001	CSIRO Medal for team research
2004	Top100 Award
2005	JG Wood Lecturer (Australian Society of Plant Scientists)
2005	Gary Comer Climate Change Mentor Award
2006	Honorary Doctorate, Universiteit Antwerpen
2009	Land & Water Senior Research Fellowship
2011	Alexander von Humboldt Research Award
2013	Einstein Professor of Chinese Academy of Sciences
2013	Honorary Doctorate, University of Wageningen
2013	Elected Foreign Associate of the U.S. National Academy of Sciences
2013	Honorary Professorship, Centre for Agricultural Resources Research Shijiazhuang, Chinese Academy of Sciences
2015	Carnegie Centenary Professorship (Universities of Scotland)

2015 Elected to Life Membership of the Australian Society of Plant Scientists
2016 Macfarlane Burnet Medal and Lecture

Other Awards and Distinctions

2003 Centenary Medal: Citation '*For service to Australian society and science in plant physiology*'.
2006 Royal Society of Tasmania R.M. Johnston Memorial Medal. Awarded to "a scholar of great distinction in any field within the Society's purview."
2007 Shared Nobel Prize: Inter-governmental Panel on Climate Change
2011 Peter Baume Award: The Australian National University's highest award
2013 Order of Australia Officer (AO) in the General Division
2014 Rank Prize (U.K.) (Nutrition, animal & crop husbandry - shared with RA Richards)
2015 Prime Minister's Prize for Science
2017 Kyoto Prize for Basic Sciences
2018 A.C.T. Senior Australian of the Year
2018 Senior Australian of the Year

Membership of Learned Societies

- Australian Society of Plant Scientists
- Australian Academy of Science
- American Society of Plant Biologists
- Royal Society of London
- American Geophysical Union
- European Geosciences Union
- U.S. National Academy of Sciences

Fields of Interest

- Integration of photosynthesis and growth with nitrogen and water use of plants
- Stomatal physiology
- Isotopic composition of plants
- Global change science

Present Position

Distinguished Professor at The Australian National University (ANU) since 2003

Other Posts

1973 - 75 Research Associate, DOE Plant Research Laboratory, MSU 1975 - 76 Research Specialist, DOE Plant Research Laboratory, MSU 1976 - 80 Research Fellow, ANU
1980 Senior Research Fellow, ANU
1980 - 83 Fellow, ANU
1983 - 88 Senior Fellow, ANU
1988 – 2003 Professor, ANU
1988 – 89 Group Leader of Plant Environmental Biology, RSBS, ANU
1998 - 2001 Deputy CEO and Program Leader, CRC for Greenhouse Accounting
1994 - 2009 Group Leader of Environmental Biology Group, RSBS, ANU
2005 – 2008 Associate Director, Research School of Biological Sciences (RSBS)

Other Activities

The Australian National University

1980 - 90 Member, ANU Arts Centre Committee of Management
1994 - 97 Chairman, ANU Global Change Confederation
1998 - 99 Member, Board of the Institute of Advanced Studies, ANU

2001 Member, Steering Committee for the National Institute of Bioscience
2002 - 05 Member, Academic Board, ANU
2002 - 05 Member, National Institute for the Environment
2002 Member, Advisory Board of the ANU Centre for Complex Systems
2003 - 04 Chair, Board of Institute of Advanced Studies [from Sept 2003]
2004 - 05 Chair, Institute of Advanced Studies Forum
2005 Member, Board of the Faculties
2005 Member ANU-CSIRO Alliance Steering Committee and ANU Focus Group for Changing Research Practices
2005 Member, ANU Relationships and Funding Planning Groups
2005 Member, ANU Research Development Working Group
2005 - 2008 Board Member, Australian National University Institute for Environment
2006 – 2009 ANU Person Designated to Receive Formal Complaints in Science
2007 - 2009 Member, Senior Advisory Board, BioSolar Project
2009 - 2010 Member, Institute of Advanced Studies sub-committee of the University Research Committee
2010-current ANU Research Misconduct Assessor for Science
2013- Member Selection Committee for JG Crawford Prize

Australian Academy of Science

1990 - 94 Member, Sectional Committee 5,
1993 Member, National Primary School Project Advisory Committee
1993 Chairman, Gottschalk Award Committee
1994 - 97 Member, Council
1996 - 97 Chairman, AAS National Committee on Climate and Global Change
1996 - 97 Vice President
2007 – 2011 Member, Video Histories Committee
2007 - 2011 Vice President and Secretary (Biological), member of Executive Committee and of Council

Royal Society

2007 – 2011 Member, Theo Murphy Fund Advisory Board
2010 -2011 Member, Organising Committee, Reducing Greenhouse Gas Emissions from Agriculture: Meeting the Challenges of Food Security and Climate Change. London 28Feb-1 Mar 2011
2014 – 2016 Member of Sectional Committee 9

Journal Editorial and Advisory Boards

1984 - 89 Member, Advisory Committee for the *Australian Journal of Plant Physiology*
1985 - 93 Member, Editorial Board of *Planta*
1986 - 89 Member, Editorial Advisory Panel of *Tree Physiology*
1986 - 95 Member, Editorial Board of *Functional Ecology* (British Ecological Society)
1987 - 2001 Member, Review Board of *Plant, Cell and Environment*
1990 - 94 Chairman, Advisory Committee for the *Australian Journal of Plant Physiology*
Member, Board of the Australian Journals of Scientific Research
1993 - 96 Member, Editorial Board, *Plant and Soil*
1993 - 99 Member, Editorial Review Board, *Tree Physiology*
1994 - 98 Member, Editorial Board, *Oecologia*
1997 - 2005 Subject Editor, *Plant, Cell and Environment*
2002 Editorial Board – *Mitigation and Adaptation Strategies for Global Change*
2005 -2013 Associate Editor, *Plant Cell & Environment*
2005 -2008 Chair, *Functional Plant Biology* Editorial Advisory Committee
2005 -2008 Member Board of Standards for CSIRO/AAS Journals
2008 -2013 Associate Editor, *Ecohydrology*
2008 -2020 Associate Editor – *Water Resources Research*
2011 Member Advisory Board *Environment Control in Biology* (Japan)
2013-current Associate Editor *Plant Physiology*

Other Professional Bodies Activities

2003 -2008 Board Member, Federation of Australian Scientific and Technological Societies
2004 -2010 Board Member, Australian Society of Plant Biologists

Institute/Organisation Reviews and Scientific Advisory Boards

1992 Member, INRE Review Committee on CSIRO Division of Atmospheric Research
1998 Reviewer, with Ray Walker, of Australian Biological Resources Study (ABRS) for Environment Australia
2002 Reviewer, University of Western Australia's Institute of Advanced Studies
2004 - 2017 Member, Scientific Advisory Board for the Max-Planck-Institute for Biogeochemistry
2005 - 2007 Member of Review Panel, Australian Nuclear Science and Technology Organisation (ANSTO) "Isotopic Tracers in Atmospheric Transport" (*IsoTrans*) project
2005 Member Expert Advisory Board of Impacts Centre for Southeast Asia (ICSEA)
2008 Reviewer UK Biotechnology and Biological Research Council (BBSRC) Climate Change Strategic Review of Climate Change Research
2009 Panellist for NSF/Gates Foundation *BREAD* Program
2010 Mentor for NSF/BBSRC Photosynthesis Ideas Lab
2012 - 2017 Member, Max Planck Research Field Commission
2013 - 2015 Member, Singapore National Research Foundation Competitive Research Program Panel
2015 Member, Griffith University Environmental Futures Research Institute Advisory Committee.

Co-founder Cooperative Research Centre for Greenhouse Accounting

1998-2000 Deputy CEO and Program Leader,
2001-2006 Board alternate
2002-2006 Member, Management Team

Government Service

1994 - 98 Chairman, National Greenhouse Gases Inventory Working Group on Carbon Dioxide from the Biosphere
1997 Science adviser and Australian delegate to Framework Convention on Climate Change, Conference of Parties, Kyoto
1997 - 2000 Member, Greenhouse Science Advisory Committee
1997 - 1999 Member, Reference Group for Greenhouse Challenge Sinks Workbook
1998 - 2000 Member, High Level Steering Committee, National Carbon Accounting System, Australian Greenhouse Office
2002 Member, Minister's Consultative Panel on National Research Priorities
2002 Member of Minister's Reference Group on Mapping Australia's Science and Innovation System
2007 - 2008 Member, Climate Change Research Strategy for Primary Industries. Joint Federal, State & Territory governments, CSIRO, Rural Research & Development Corporation; managed by Land & Water Australia

Australian Research Council

1990 - 1993 Member, Biological Panel, Research Grants Committee
2005 – 2008 Australian Reader
2014- current PI ARC Centre of Excellence on Translational Photosynthesis

International Committees

1983 Australian organiser of US/Australia Science and Technology Agreement Workshop on Stomatal Function
1986 - 93 Elected to International Photosynthesis Committee
1986 - 96 Member, Australian Committee for International Geosphere - Biosphere Programme (IGBP)
1989 - 90 Member, International Coordinating Panel on Biospheric Aspects of the Hydrological Cycle (IGBP)
1990 - 93 Member, Scientific Steering Committee, International Global Atmospheric Chemistry Project (IGAC/IGBP)
1994 - 96 Member, South-East Asian Regional Committee for START

1994 - 96 Chairman, Australian Committee for IGBP.
2006 – 2007 Member, Scientific Advisory Committee for Isotopes 2007 conference, Benicassim, Spain.
2008 - 2011 Member, Scientific Committee for International Botanical Congress, Melbourne 2011
2009 Member, Scientific Steering Committee for the International Carbon Dioxide Conference 2009, Jena, Germany.
2010–2013 Member International Organizing Committee for the fourth InterDrought congress (ID4), Perth (Australia) in September 2013
2010-2012 Member of the International Scientific Board (ISB) of the joint FESPB/EPSO Plant Biology Congress (July 29th to August 3rd, 2012. Freiburg, Germany).

Inter-governmental Panel on Climate Change

1994 - 96 Lead Author on Second Assessment Report
1994 Member, Australian Academy of Technology Sciences and Engineering Steering Committee on Climate Change
1998 - 2001 Lead Author on Third Assessment Report
1988 – 2000 Convening Lead Author on Special Report on Land Use, Land Use Change and Forestry
2006 – 2007 Reviewer for Fourth Assessment Report

Patents

Masle J, Gilmore SR and Farquhar GD. "The use of the ERECTA gene to control water use efficiency in plants": International Patent Application, number WO 2004/005555 A1 (priority date 02 July 2002). Granted Aug 7, 2008 in Australia AU 2003/236580 B2, in Germany DE 60336328 D1 Apr 21, 2011, in Spain ES 2362903 T3 Jul 14, 2011.

Publications

354 research publications (see below)

Books

- Stomatal Function. 1987. EF Zeiger, GD Farquhar, IR Cowan (eds). Stanford University Press. Stanford, California
- Perspectives of Plant Carbon and Water Relations from Stable Isotopes. 1993. J Ehleringer, AE Hall, GD Farquhar (eds). Academic Press, NY
- Plants in Action: Adaptation in Nature, Performance in Cultivation. 1999. B Atwell, P Kriedemann, C Turnbull (eds). D. Eamus, R. Bieleski (Co-eds.) G. Farquhar (Consulting ed.). Macmillan

Lectures

Invited lectures given at the following International and Australian Symposia

2020 Carbon isotope discrimination and water-use efficiency. Stable Isotopes in the Biosphere 2020. ANU Canberra. January 20.

2019 Using simple mathematics to explore the plant-atmosphere exchange of carbon dioxide, oxygen and water vapour. Shandong University, Weihai, China. November 29.

Using simple mathematics to explore the plant-atmosphere exchange of carbon dioxide, oxygen and water vapour. Czech Society of Experimental Plant Biology. České Budějovice, Czech Republic, August 27.

The magical mystery tour from physics and applied mathematics to plant physiology. My life as an EMCR. ARC Centre of Excellence for Translational Photosynthesis, Brisbane, July 2.

2018 As Senior Australian of the Year for 2018 I gave many lectures to different groups including schools in Melbourne, Tasmania and New South Wales, Legacy in Melbourne, an old people's home in Wollongong, and groups of retirees and other interests in Canberra. The following are scientific talks:

My earliest and latest modeling studies (optimal water use and the intersection of photorespiration and N metabolism) UC Davis CA. September 23.

Science presentation, ICOFEST (Integrating CO2 Fertilisation Evidence Streams and Theory: Global Terrestrial Carbon Sink), Biosphere 2, Arizona. September 20.

Carbon gain in relation to water loss in the face of global change. Invited Lecture. International Horticultural Congress. Istanbul, August 12.

My earliest and latest modelling studies (optimal water use and the intersection of photorespiration and N metabolism). Department of Plant Sciences, Oxford University, May 9.

Adventures across disciplines: studying biophysics, and observing the shaping of policies. Kyoto Laureate Commemorative Lecture, Blavatnik School of Government, Oxford University, May 8.

My latest modelling studies. Stanford University, California, March 28.

Terrestrial land surfaces- a *pot pourri.* JPL Center for Climate Sciences, CALTECH, Pasadena, CA. March 26

My latest modelling studies. University of California, San Diego. March 23.

The magical mystery tour from physics and applied mathematics to plant physiology. Commemorative Lecture for the Kyoto Prize for Basic Sciences, University of California, San Diego. March 21.

2017 My latest modeling studies. Keynote talk. Commemorative workshop for Professor Graham Farquhar, 2017 Kyoto Prize laureate: Modelling Plant Responses to Environmental Factors. University of Tokyo, November 17

The Magical Mystery Tour from Physics and Applied Mathematics to Plant Physiology. Commemorative Lecture for Kyoto Prize in Basic Sciences, Kagoshima Japan, November 16.

The Magical Mystery Tour from Physics and Applied Mathematics to Plant Physiology. Commemorative Lecture for Kyoto Prize in Basic Sciences, Kyoto, November 11.

On the plant-atmosphere exchange of carbon dioxide, oxygen and water vapour *Plenary Lecture* Japan Society for the Promotion of Science Alumni Association in Australia. Australian Academy of Science, 9 October.

Photosynthetic eco-physiology. International Workshop on Crop Photosynthetic Ecophysiology. Wuhan, China, 21 – 26 August.

Scaling photosynthesis from chloroplasts to leaves. Workshop on 3D Leaf Imaging and Modeling. University of Sydney. 19-21 July.

A plant physiologist's view of the Dole Effect OR The role of vegetation in the atmospheric sink or carbon dioxide. Symposium "The Northern Hemisphere Carbon Sink". Jena Germany May 30

Climate & optimal water use. Bengaluru University India Feb 27

Climate & optimal water use. Interdrought V. Hyderabad, India February 22

2016 Applications of ^{18}O in carbon dioxide, water and plant leaves. Shenzhen, China, 30 November

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. Shenzhen, China, 28 November

Plant water use and carbon gain and the isotopologues of carbon dioxide (in the context of climate change). ISI 2016, Nantes France, 6 October.

Plant growth in a changing climate: multi-decadal changes particularly related to eCO2, precipitation and crop demand for water. Friends of Australian National Botanic Gardens. Canberra August 25.

2015 Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. University of Edinburgh, Scotland, July 23.

Predicted and observed multi-decadal changes in climate, with particular reference to precipitation and crop demand for water. University of Aberdeen, Scotland. July 15.

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. Glasgow University, Scotland, June 15.

Predicted and observed multi-decadal changes in climate, with particular reference to precipitation and crop demand for water. Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, June 6.

Predicted and observed multi-decadal changes in climate, with particular reference to precipitation and crop demand for water. Opening address to Water and Food Security under Changing Environments Center for Agricultural Water Research in China, China Agricultural University (CAU) Beijing June 1 – 7

Climate Change Effects on Vegetation, and *Vice Versa*. From leaves to ecosystems: Plants in a changing world. 10th Annual Harvard Plant Biology Symposium. Harvard University, May 6

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. Umeå University, Sweden, 22 January.

2014 Global dimming, stilling, evaporative demand and transpiration. American Society of Agronomy AGM. Long Beach, CA, USA 4 November

Heavy water fractionation during transpiration. Daintree meeting, James Cook University 15 September

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. Princeton University 12 August

High VPD & rapid transpiration rate: a direct source of stress. Salt & Water Stress in Plants. Gordon Research Conference, Newry, Maine 5 August

Predicted and observed multi-decadal changes in climate, with particular reference to precipitation and crop demand for water Breeding Plants to Cope with Future Climate Change University of Leeds 17 June

Some Effects of Atmospheric and Climate Change on Photosynthesis and Transpiration at Various Scales, (and vice versa). Gordon Research Conference. CO2 Assimilation in Plants: Genome to Biome. Waterville Valley, NH 9 June

Modeling carbon uptake and water use by plants: Evaluation of the assumptions included in gas exchange measurements (Ubierna et al.) Gordon Research Conference. CO2 Assimilation in Plants: Genome to Biome. Waterville Valley, NH 12 June

Scaling leaf level photosynthetic models from the leaf to the canopy. Joint CAS-CSIRO Workshop “Improving Photosynthesis and Yield Potential in Cereal Crops : Modelling, Mechanisms and Methods” 1 June

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. University of South Australia, Mawson Lakes 19 May

Wheat and climate change. Borlaug Summit on Wheat for Food Security. CIMMYT, Obregon, Mexico, 27 March

Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. East Malling Research February 11; Plant Sciences, Cambridge University Feb 12; Plant Science, Glasgow University Feb 14; WSL ETH Zürich Switzerland April 3.

Water-use efficiency in wheat (with Richard Richards). 2014 Rank Prize Presentation, February 10, London

2013 Water-use efficiency and water use effectiveness, a stomatal perspective using stable isotopes. Opening Address: Water & Agriculture Forum. Chinese Academy of Sciences, Shijiazhuang. June 17.

Opportunities for improving plant water-use efficiency PIARN Symposium – Farm Profitability in a Food Insecure World. University of Melbourne, June 3

Relating variations in runoff to variations in climatic conditions and catchment properties. Opening hydrological talk. European Geophysical Union, April 8, Vienna, Austria.

Climate change and some likely effects on photosynthesis, evaporation and food production. Dies Natalis. March 15. University of Wageningen.

Integrating photosynthetic carbon assimilation from the leaf to the canopy. March 13. University of Wageningen.

Some thoughts on responses of vegetation to increased [CO2]. March 13. University of Wageningen.

2012 Concepts and models of stomatal function and functioning. Opening address. *Stomatal conductance through time: towards accurate estimates of physiological CO_2 –forcing of the climate*. September 17. Royal Netherlands Academy of Science, Amsterdam.

Several lectures, July-August. Chinese Academy of Science, Beijing & Xinjiang, China

From Guard Cell to Globe. INRA Nancy, June 22, France

From Guard Cell to Globe. Universiteit Würzburg, June 4, Germany

Linking plant physiology to landscape issues using stable isotope technology. January 5, ZALF, Berlin, Germany.

2011 Some Thoughts on Isoscapes. Keynote address. *Isoscapes 2011*. September 26, Purdue, USA.

Modelling of photosynthesis and stomatal conductance; global isotope modeling. *Workshop on Forest sensitivity to CO_2*. August 1. Sydney University.

Integrating photosynthetic carbon assimilation from the leaf to the canopy in the context of global change. Major Speaker, *Annual General Meeting, American Society of Plant Biology* August 9, Minneapolis, USA

Water-use efficiency and Water-use effectiveness. *Australia-US Science and Technology Joint Commission Meeting*. February 14, Washington, USA

2010 Global change, soil water content, stomatal behavior and the statistics of rainfall. American Geophysical Union AGM. December, San Francisco, USA

Climate change and its likely effects on photosynthesis, evaporation and food production. International Photosynthesis Congress August 27, Beijing, China.

Photosynthesis: a litany of limitations *NSF Photosynthesis Ideas Lab Planning Meeting* June 30, Washington, USA

2009 Plant Water Use Effectiveness. Keynote Address, *10th Australasian Environmental Isotope Conference & 3rd Australasian Hydrogeology Research Conference* 1-3 December 2009, Perth, WA

Climate change and its likely effects on food production. Opening Plenary Address*, The 3rd International Conference on Integrated Approaches to Improve Crop Production Under Drought Prone Environments (Interdrought III)*, October 12, Shanghai, China

Evaporative demand, transpiration, and photosynthesis: How are they changing? Atmosphere and Climate Colloquium, April 27, IAC*ETH* (Institute for Atmospheric and Climate Science, Swiss Federal Institute of Technology), Zurich, Switzerland.

Evaporative demand, transpiration, and photosynthesis: How are they changing? EGU (European Geosciences Union) General Assembly, *Land-climate interactions from models and observations: Implications from past to future climate* session, April 19-24, Vienna, Austria.

2008 Carbon isotope discrimination, water-use efficiency and water-use effectiveness. Resource Capture by Crops: Integrated Approaches, September 10-12, University of Nottingham, Sutton Bonington, United Kingdom.

Carbon Isotope discrimination by leaves.
Joint European Stable Isotopes User Group (JESIUM) August 31 – September 5, Presqu'île de Giens, France.

Carbon isotope discrimination, water-use efficiency and water-use effectiveness. International Workshop on Soil-Plant Interactions and Sustainable Agriculture in Arid Environments, July 11-18, Shihezi University, Xinjiang, China.

Pan Evaporation – wind speed.
Miniconference on Relative Humidity, Earth Temperature and Climate Change, June 23-24; Lamont-Doherty Earth Observatory of Columbia University, New York USA

Opening Address
Uni Sydney Faculty of Agriculture, Food and Natural Resources Symposium Facing climate change: Research on adaption of agro-ecosystems, June 13, University of Sydney.

CO2, climate change, and agriculture: it's more or less about water.

and,

Carbon isotope discrimination and plant water-use effectiveness.
Distinguished Ecologist Lecture Series, April 11-15, University of Wyoming, Laramie, US.

2007 PenPan: A general tool for the attribution of changing pan evaporation.
AGU Meeting, San Francisco, USA.

The economics of plant water loss and photosynthetic carbon gain.
Guangzhou, China

The economics of plant water loss and carbon gain.

Evaporative demand and the hydrological cycle.
Université Paris Sud XI, Paris, France.

Implications of climate change for water use by agriculture and natural ecosystems.
Treasury Seminar Series, Canberra.

Carbon isotope discrimination and water-use effectiveness.
LaTrobe University, Melbourne.

C02 climate change, and agriculture: it's more or less about water.
LaTrobe University, Melbourne.

Terrestrial carbon sequestration and impacts on global greenhouse gas emissions.
Australian Bureau of Agricultural and Resource Economics (ABARE) Boathouse IV Meeting "Climate Change Impacts: Adaption and Mitigation Policy Responses".

The evaporation paradox, and the roles of global dimming and stilling.
Comer Science and Education Foundation "Gary C. Comer Abrupt Climate Change Fellowship Conference", New York, US.

Climate change, temperature changes and plant responses.
International Rice Research Institute (IRRI) workshop on "Cool rice for a warmer world", Wuhan, China.

CO2, climate change, and agriculture: it's more or less about water.
Australian Bureau of Agricultural and Resource Economics (ABARE) Outlook 2007 Conference, Canberra.

Plant physiological responses to environmental forcing - How do stable isotopes behave?
European Science Foundation (ESF) Stable Isotopes in Biospheric-Atmospheric Exchange (SIBAE) Workshop on: "Stable Isotopes in Dendroclimatology - Current Status and Future Prospects." GeoForschungszentrum Potsdam (GFZ), Germany.

2006 Revisiting optimisation theory and transpiration efficiency.
The Biology of Transpiration: From Guard Cells To Globe. American Society of Plant Biologists Conference, Snowbird, Utah, US.

Carbon isotope discrimination by Rubisco and diffusion in leaves: applications to plant

water-use efficiency and finding a gene.
The 5th International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Queens University, Belfast, Ireland

Plant water-use efficiency and carbon isotope discrimination
Monash University, Melbourne.

The ACCESS Initiative: Understanding the Future Functioning of Australia's Landscapes.
Australian Academy of Science, Canberra

Carbon isotope discrimination and plant water-use efficiency: ideas, agricultural uptake and now a gene.
Royal Society of Tasmania, Tasmania.

Increasing Atmospheric C02 and its Implications
Global Change And The Earth System Symposium on ANU Research, Canberra

Worldwide Changes in Atmospheric Composition and Evaporative Demand and their Effects on Plant Growth and Water Use.

Carbon isotope discrimination and plant water-use efficiency: ideas, agricultural uptake and now a gene.
Peking University, Beijing, China.

Carbon isotope discrimination and plant water-use efficiency.
Universiteit Antwerpen, Belgium.

Plant water-use efficiency and carbon isotope discrimination.
South African Plant Breeders Association 6th Annual Symposium, Langebaan, South Africa.

Climate change and the carbon cycle: Nonlinearities & uncertainties. British Council Workshop International Networking for Young Scientists. Australian National University

2005 Carbon isotope discrimination and water-use effectiveness.
Melbourne University, Melbourne.

Worldwide Changes in Evaporative Demand. Working Group on 'Water and the Environment'. Vatican City.

Evaporative Demand and Climate Change.
Abrupt Climate Change Fellowship Roundtable 2005. Palisades, New York.

Carbon isotope discrimination and water-use efficiency.
J G Wood Lecture, ComBio2005. Adelaide

From Pan Evaporation to Pinatubo.
Energy Modelling Forum, Climate Change Impacts and Integrated Assessment Meeting, Snowmass, Colorado, USA

From the chloroplast via stomata to the atmosphere and back.
Isotopes 2005 Bath. University of Bath, UK.

Trends in Pan Evaporation, Global Dimming and Brightening: Theory, Observations and Implications for the Terrestrial Water Balance

Carbon Gain and Water use by Plants, and Their Interpretation Using Stable Isotopes

Are Estimates of the Terrestrial Water Balance All Wet?
2005 Distinguished Ecologist Lecture Series. Colorado State University, USA

Trends in Pan Evaporation, Global Dimming and Brightening: Theory, Observations and Implications for the Terrestrial Water Balance
Institute for Multi-disciplinary Earth Studies, National Centre for Atmospheric Research. Boulder, USA

Drier or Wetter Under Climate Change?
Science Meets Parliament Forum “Climate Change: what is the scientific consensus?”, Canberra, ACT.

2004 The pan evaporation paradox – an overview of the scope of the problem. Australian Academy of Science Pan Evaporation Workshop. Canberra, ACT.

Trends in Pan Evaporation: Theory, Observations and Implications for the Terrestrial Water Balance. 16th Australian and New Zealand Climate Forum, Lorne, Victoria.

Modelling leaf water enrichment. Biosphere-Atmosphere Stable Isotope Network (BASIN) and Stable Isotopes in Biospheric-Atmospheric Exchange (SIBAE) “Oxygen isotopes as a tracer linking global O2, CO2, and H2O cycles” joint meeting. Marshall, USA.

Carbon Gain and Water Use by Plants. Gordon Research Conference, The Metabolic Basis of Ecology, Maine, USA

Pan Evaporation in the Southern Hemisphere: What is Happening? AGU-CGU Union Joint Assembly, Magnitudes and causes of declining solar radiation at the surface: Montreal, Canada

Oxygen isotopes in leaf water, and CO2 – remember the gross fluxes. Stable Isotopes in Biospheric-Atmospheric Exchange (SIBAE) and Biosphere-Atmosphere Stable Isotope Network (BASIN) joint conference. Interlaken, Switzerland.

Entropy production during plant gas exchange. Maximum Entropy Production Workshop: INRA Bordeaux-Aquitaine, France

2003 Oxygen isotope enrichment of leaf water and organic matter. SIBAE BASIN Workshop: Orvieto, Italy.

Why is pan evaporation rate going down in the northern hemisphere if there is global warming? The Climate Centre Fall 2003 Lecturer : Columbia University, USA LDEO Campus.

Pan evaporation rate in the southern hemisphere: implications for greenhouse vs aerosols. The Climate Centre Fall 2003 Lecturer: Columbia University, USA NASA/GISS Campus.

Oxygen isotopes in leaf organic material. NETCARB Third Summer School: Germany.

The cause of decreased pan evaporation over the past 50 years. EGS-AGU-EU6 Joint Assembly: Nice, France.

The cause of decreased pan evaporation over the past 50 years. MEP Workshop: Bordeaux, France.

Incorporating the effects of diffuse light in simple models of photosynthesis and evaporation: implications for a canopy and the globe. Monsi & Saeki Symposium: Kyoto,

Japan.

2002 Processes affecting the 18O composition of leaf water. Stable Isotopes and Biosphere-Atmosphere Interactions. Banff, Canada.

On the spatial variation of the isotopic composition of leaf water. Stable isotope Techniques for the Analysis of Plant Metabolism, Nantes, France.

2001 Unanswered questions about stomatal functioning. Forests at the Land-Atmosphere Interface, Edinburgh.

Biological questions on the Dole effect. Fourth International Symposium on Inorganic Carbon Utilization, Cairns.

Role of terrestrial sequestration in meeting Kyoto targets. Australian Petroleum Production and Exploration Association Ltd Conference, Hobart.

Honouring research in Australia: A Scientists Perspective. ISI Honouring Research in Australia, Canberra.

Applications of stable isotopes in palaeoecology. Spring Meeting American Geophysical Union, Boston.

Forests, Forest Industry and Greenhouse Effect. 14th Convocation of the International Council of Academics of Engineering and Technological Sciences – World Forests and Technology, Finland.

2000 Forest, forest industry and greenhouse effect. Fourteenth CAETS Convocation, World Forests and Technology, Espoo, Finland.

Transpiration efficiency and carbon isotope discrimination. Water and Plants in the Landscape, CSIRO, Canberra.

1999 Carbon dynamics: a major driver of global change. The Global Change Transects Workshop, Darwin.

Oxygen isotope composition of organic matter. International Conference on Stable Isotopes and Isotope Effects, Carry le Rouet, France.

Oxygen isotope composition of organic matter. Fifth European Symposium on Food Authenticity, La Baule, France.

Global change: a plant perspective using carbon and oxygen isotope ratios. Australian and New Zealand Society for Mass Spectrometry Conference, Thredbo.

Global change: a plant perspective using carbon and oxygen isotope ratios. Stable Isotope Techniques Workshop, University of Western Australia, Perth.

1998 Kyoto – The Impact on Australia, APEC Centre, Melbourne.

Where could Australia's forests move with change in atmospheric composition: some ideas from plant physiology and the paleo-record. CSIRO and Bureau of Resource Science, Canberra.

Global change: a plant perspective. Yale University, Connecticut, USA.

Australian Quaternary Palaeoecology and Palaeoclimatology Workshop, Academy of Science, Canberra.

National Association of Forest Industries (NAFI), presentation at Greenhouse Stakeholders meeting, Canberra.

1997 What are Stomates For? Journal of Experimental Botany Symposium, University of Kent, Canterbury, UK.

Vegetation-Climate-Atmospheric Interactions: Past, Present and Future. Royal Society Symposium, London, UK.

1996 Design of a Carbon Cycle Observing System, Boulder, Colorado, USA.

Stable Isotopes and the Integration of Biological, Ecological and Geochemical Processes Conference, Newcastle, UK.

NCAR Summer Colloquium, Terrestrial Ecosystems and the Atmosphere, Boulder, Colorado, USA.

1995 Global Change: a plant perspective, IGBP/ICSU Forum on Earth System Research, Beijing, China.

Plant response to CO_2: Is plant growth being stimulated by increasing atmospheric CO_2? US National Academy of Sciences, Colloquium on Carbon Dioxide and Climate Change, Irvine, California, USA.

1994 Signals from plants seen in atmospheric CO_2 and its isotopes, 5th Australian Environmental Isotopes Conference, Brisbane.

Biosphere 2 - a plant perspective, Space Biosphere Ventures, Oracle, Arizona, USA.

The global carbon budget, Greenhouse '94, Wellington, New Zealand.

1993 Ecophysiology and Genetics of Trees and Forests in a Changing Environment, Viterbo, Italy.

Genetic and environmental effects on carbon and oxygen isotope discrimination during CO_2 assimilation, International Botanical Congress, Yokohama, Japan.

Optimisation of stomatal behaviour and water-use efficiency at elevated CO_2 concentration and temperature, International Botanical Congress, Yokohama.

^{18}O effects during CO_2 assimilation, International CO_2 Conference, Carqueiranne, France.

1992 International Symposium on Perspectives of Plant Carbon and Water Relations from Stable Isotopes, Riverside, California, USA.

Photosynthetic Responses to the Environment, Kona, Hawaii.

IPCC meeting on Biotic Feedbacks in the Global Carbon Cycle, Wood'sHole, Massachusetts, USA.

1991 International Global Atmospheric Chemistry, San Jose dos Campos, Brazil.

International Symposium: Physiology and Determination of Crop Yield, Gainesville, Florida, USA.

1990 Degradation of Vegetation in Semi-Arid Regions: Climate Impact and Implications, Sydney.

Mathematical and Statistical Modelling of Global Change Processes, Canberra.

Water and Life: Comparative Analysis of Water Relationships at the organismic, Cellular and Molecular Levels, Crans- sur-Sierre, Switzerland.

Trends in Photosynthetic Research, Palma de Mallorca, Spain.

FAO/IAEA International Symposium on the Use of Stable Isotopes in Plant Nutrition, Soil Fertility and Environmental Studies, Vienna, Austria.

Scaling Processes between Leaf and Landscape Levels, Snowbird, Utah, USA.

1989 International Geosphere-Biosphere Workshop: Global Change - A Plant Perspective, Brisbane.

Symposium on Perspectives in Biochemical and Genetic Regulation of Photosynthesis, New Haven, USA.

Symposium on Stomatal Resistance, University Park, Pa, USA.

Rockefeller Foundation Meeting on the Potentials of Biotechnology for Improving Grain Yield of Rice under Water Limited Conditions, Bellagio, Italy.

1988 International Geosphere-Biosphere Programme on Global Change, Canberra.

Society for Experimental Biology, Symposium on Plants under Stress, Lancaster, UK.

Royal Society meeting on Measurement of Photosynthesis, London, UK.

Photosynthesis Symposium, Stanford, USA.

US-Australia Workshop on Remote Sensing of Biosphere Functioning, Honolulu, USA.

1987 6th Annual Plant Biochemistry and Physiology Symposium, Columbia, Missouri, USA.

Rubisco 87, Tucson, USA.

Vth International Conference on Mediterranean-Climate Ecosystems, Montpellier, France.

XIV International Botanical Congress, Berlin, West Germany.

Society for Experimental Biology Meeting on Plants and Temperature, Colchester, UK.

Second German-French Colloquium on advances in research and use of stable isotopes, Maria Laach, West Germany.

NATO Advanced Research Workshop, Forest Biomass for Fiber and Energy, Obidos, Portugal.

International Symposium on Improving Winter Cereals Affected by Temperature and Salinity Stresses, Cordoba, Spain.

1986 NASA Conference on Climate-Vegetation Interactions, Goddard Space.

Applications of Stable Isotope Ratios to Ecological Research, UCLA Lake.

Arrowhead Conference Center, USA.

VII International Congress on Photosynthesis, Brown University, Providence, RI, USA.

1985 The Changing Earth: an Australian Perspective, Canberra.

Regulation of CO_2 assimilation, Gordon Conference on CO_2 fixation by green plants, New Hampshire, USA.

BP Venture Research Conference, London, UK.

1984 British Plant Growth Regulator Group Meeting, York, UK.

Conference on Coasts and Tidal Wetlands of the Australian Monsoon Region, Darwin.

1983 Gordon Conference on the Chemistry and Physics of Isotopes, Santa Barbara, California, USA.

US-Australia Workshop on Stomatal Function, Honolulu, USA.

International Congress on Photosynthesis, Brussels, Belgium.

Symposium on the Kinetics of C_3 Photosynthesis, Tallinn, Estonia, USSR.

1982 AAAS Conference on Plant Responses to Rising CO_2 concentration, Athens, Ga, USA.

Ewing Symposium. Climate Processes: Sensitivity to Solar Irradiance and CO_2, New York, USA.

PhD Students supervised [with graduation date]

1979	SC Wong
1981	MC Ball
1981	S von Caemmerer
1981	G Constable
1984	SF Ledgard
1984	JR Evans
1986	A Brooks
1986	MUF Kirschbaum
1988	AG Condon
1990	D Bagnall
1992	S Henderson
1992	J Virgona
1992	C López-Castañeda
1993	H Gomez-Macpherson
1996	D de Pury
1996	G Beemster
1996	A van Herwaarden
1997	PJ Franks
1998	M Barbour
2001	J Yong
2001	M Böhm
2002	T June
2003	J Styles
	K Gan
	J Miller
	I Tremmel
2004	L Cernusak
2005	Y Zhou
2006	S. Gilmore [co-supervisor with Dr J. Masle]
2007	X. Sirault
2019	R. Deans

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★ *Most significant publications*

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12. Farquhar GD (1979) Models describing the kinetics of ribulose biphosphate carboxylase-oxygenase. **Arch. Biochm. Biophys.** 193(1):456-468.
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14. Farquhar GD (1979) Carbon assimilation in relation to transpiration and fluxes of ammonia. *In* Photosynthesis and Plant Development. R Marcelle, H Clijsters and M van Poucke (eds). Junk, The Hague, pp 321-328.
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