

Curriculum Vitae, Peter Thorburn

Contact details

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Summary

Dr Peter Thorburn is an internationally renowned agricultural modeller, who has demonstrated innovation in both model development and application. His research has had substantially policy impact, particularly in protecting the Great Barrier Reef from impacts of agricultural pollutants.

Within CSIRO Dr Thorburn has a range of responsibilities. He is a Research Group Leader in the Integrated Agricultural Systems Program of CSIRO Agriculture and Food (CA&F). His multidisciplinary Group has 45 staff located across three sites researching diverse aspects of farming systems (e.g. optimising risk-return trade-offs in cropping and mixed crop-livestock production systems, improving pest and disease control, minimising environmental impacts).

Dr Thorburn represents CSIRO on the APSIM Initiative, co-leads the collaboration between CA&F and AgResearch New Zealand (one of CA&F's key science partners) and leads the CA&F Impact Focus Area on reducing environmental impacts of sugarcane farming. He also sits on the Science Advisory Committees of the OVERSEER® (New Zealand) nutrient dynamics model and the National Environmental Science Program Tropical Water Hub.

Academic qualifications

Ph D, The Flinders University of South Australia, 1993, Soil Physics and Ecophysiology.
M Phil, Griffith University, 1988, Soil Physics.
B Agr Sc, University of Queensland, 1981.

Background

Dr Thorburn joined CSIRO in 1996 after having worked with the Queensland Department of Primary Industries. While with the Department, he researched the cause and management of soil salinity in both rainfed and irrigated farming systems, developing and applying a number of inverse modelling techniques for better quantifying and modelling water fluxes in saline lands. On joining CSIRO, he changed research direction, quantifying and simulating nitrogen, carbon and water cycling in agricultural production systems. In that time he also had significant impacts in development and application of simulation models, including improving the understanding of modeller-stakeholder relationships, model uncertainty and applying his knowledge to reduce environmental impacts of agriculture. Across the two organisations he has held the following positions:

- 2014 July-present: Senior Principal Research Scientist (CSOF8.2) and Research Group Leader (Integrated Agricultural Systems) CSIRO Agriculture and Food.
- 2012-June 2014: Senior Principal Research Scientist and Research Group Leader (Northern Farming Systems), CSIRO Ecosystem Sciences.
- 2002-2012: Principal Research Scientist and Research Group Leader (Production Systems Group in the Tropical Landscapes Program, then Northern Farming Systems in the Agricultural Systems Program), CSIRO Sustainable Ecosystems and CSIRO Ecosystem Sciences.
- 1996-2001: Senior Research Scientist, CSIRO Tropical Crops and Pastures and CSIRO Sustainable Ecosystems.
- 1981-1996: Soil Scientist-Senior Soil Scientist, Queensland Department of Primary Industries.

Achievements

Recent impacts

- Dr Thorburn has also applied his modelling skills and profound understanding of the agro-ecology of tropical agriculture to significantly influence government policy on protection of the Great Barrier Reef (GBR) from pollutants discharged from agriculture. In particular, his work has informed various market based instruments that have, and will continue reduce the costs of pollution abatement, and his approaches have been adopted by commercial entities. His insights into farming systems also led to an invitation to lead the management practices chapters/sections of the 2008, 2013 and 2017 Science Consensus Statements, the main science document shaping policy on GBR protection.
- Dr Thorburn has developed innovative strategies to identify the production-environmental optimum of nitrogen fertiliser management strategy for crops grown adjacent to the watersheds draining affecting GBR ecosystems. The work has been awarded 'best paper' at two international conferences. The understanding behind the strategy has been used to identify the 'highest quality' fertiliser management practice for sugarcane in policies developed to meet protect the GBR from agricultural pollution.
- Leads CSIRO's engagement with the international crop modelling community through his role in the AgMIP program. Also co-leads CSIRO's engagement with farming systems research in New Zealand, through formal collaboration with AgResearch.
- Has led CSIRO activities in modelling denitrification and gaseous nitrous oxide emissions from farming systems. This has included the development of capabilities for nitrous oxide modelling in the APSIM farming systems model, and collaboration on nitrous oxide modelling with the Australia National Agricultural Nitrous Oxide Research Program and collaborations with scientists at Iowa State University, AgResearch NZ and Colorado State University. Thorburn is also a member of the Australian Government's Nitrous Oxide Technical Working Group.

Publishing history summary (details in attached publication list)

- Referred journal papers and book chapters: >140
- Other referred publications (conference paper, reports, etc): >130
- Guest editor/co-guest editor of seven journal special issues
- Total citations: >4200
- H-index: 38

Research funding history summary (details available on request)

- Led or co-led ~40 externally funded research projects
- Total value of external funding ~\$14M

Awards

- CSIRO Agriculture and Food Director's Award for Collaboration, 2017 (Controlled Release Fertiliser Team)
- James E Truine Award for best agricultural paper, International Society of Sugar Technologists 28th Congress, 2013 (with Dr A Singels et al.).
- James E Truine Award for best agricultural paper, International Society of Sugar Technologists 26th Congress, 2007.
- CSE Program reward for Quality Leadership and Strategic Outcomes, 2006.
- Kynoch Award for best agricultural paper, the South African Sugar Technology Association annual conference, 2004.
- CSE Innovation Award, 2003 (as part of sugar systems research team).
- Kynoch Award for best agricultural paper, the South African Sugar Technology Association annual conference, 2002.
- Merit Award (best display paper), Australian Society of Sugar Cane Technologists Conference, May 2001.
- Best Presentation, CRC-Sugar Annual Conference, March 2001.
- Best Display Paper, CRC-Sugar Annual Conference, March 2001 (with C Sweeney).
- Best Display Paper, Joint International Association of Hydrogeologists and Institute of Engineers Australia International Conference, Water Down Under 94, November 1994.
- Flinders University Overseas Travelling Award, 1992.
- CSIRO Institute of Natural Resources and Environment Postgraduate Research Award, 1992.
- Australian Centre for Groundwater Studies Postgraduate Bursary, 1990.
- Australian Postgraduate Priority Research Award, 1990.
- Incitec Bicentennial International Study Award for Agriculture, Finalist, Research & Extension, 1988.

Invited conference presentations

- Invited speaker – Australasian Agricultural and Resource Economics Society 2018 Conference Workshop on Risk management in Australian agriculture: the role for insurance, February 2018.
- Invited speaker – Australasian Agricultural and Resource Economics Society, Queensland Branch Mini-symposium on Risk management in Australian agriculture (insurance focus), April 2018.
- Keynote speaker – Australian Agronomy Conference (September 2017).
- Co- Keynote speaker – iCROP-2016, an international symposium on crop modelling, Berlin, March 2016
- Invited speaker – Australian Agronomy Conference (September 2015).
- Invited speaker – American Society of Agronomy Special Symposium on Improving Tools to Assess Climate Change Effects on Crop Response, USA, October 2013.
- Invited speaker – American Society of Agronomy Special Symposium on Perspectives on Climate and Agriculture: The Agricultural Model Intercomparison and Improvement Project, USA, October 2013.
- Invited speaker – American Society of Agronomy Special Symposium on Comparison of Model Approaches to Simulation of Crop Response to Global Climate Change Effects of Carbon Dioxide, Water and Temperature, USA, October 2012.
- Invited speaker – Symposium on Climate Change Impacts on the South African Sugarcane Sector, South Africa, September 2011.
- Invited speaker – Symposium on Sustainable Soil Use in South African Sugarcane Production, South Africa, August 2011.
- Invited speaker – Australian Fertilizer Industry National Conference, Gold Coast, August 2010.

- Invited speaker – Australian Fertilizer Industry National Conference, Coffs Harbour, August 2009.
- Keynote speaker – Water for Sustainable Agricultural in Developing Regions, 8th Japan International Research Centre for Agricultural Science International Symposium, November 2001, Japan
- Invited speaker – International Workshop on the Impacts of ENSO on the Fijian Sugar Industry, Nadi, Fiji.
- Invited speaker – 26th Congress, International Society of Sugar Cane Technologists, Brisbane, September, 2001
- Keynote speaker – 4th National Workshop on Productive Use and Rehabilitation of Saline Lands, Albany, WA, March 1996
- Keynote speaker – National Workshop on Agroforestry Design Principles for Rain-fed Cropping and Pastoral Landscapes, Canberra, November 1995
- Invited presenter – 15th Annual Plant Physiology Symposium, University of California, Riverside, Jan 1992
- Invited speaker – National Workshop on Measuring Water Use of Trees and Crops with Sapflow Techniques, Loxton, May, 1992
- Keynote speaker – Vertisol Management in Africa: An International workshop of the International Board of Soil Research and Management, Zimbabwe, January 1989

Scientific and Professional Appointments

Committees and panels

- Member of the International Union for Conservation of Nature (Agroecosystem Specialist Group), from July 2018.
- Member of the panel reviewing agricultural modelling in Plant and Food Research in New Zealand, October 2016
- Member of the Science Advisory Committee of the National Environmental Science Programme, Tropical Water Quality Hub, 2015-present
- Member of the Scientific Steering Committee of the International Crop Modelling Symposium, Oslo, February 2014.
- Member of the Steering Committee for the Agricultural Production Systems sIMulator (APSIM) Initiative, 2014-present
- Member of the Expert Working Group on Wheat Plant and Crop Modeling, 2014-present.
- Member of the Scientific Advisory Group for the OVERSEER® (New Zealand) nutrient dynamics model, 2014-present.
- Member of the Scientific Steering Committee of the International Crop Modelling Symposium, Norway, February 2014.
- Member of the Australian Government's Nitrous Oxide Technical Working Group, 2013-present.
- Member of the Queensland Government's Advisory Group on evaluation of policy implementation for the Great Barrier Reef, 2009-present.
- Member of the joint Australian and Queensland Governments' Taskforce on Great Barrier Reef water quality science, 2008 and 2013.
- International consultant to the Foundation for Arable Research, New Zealand, on modelling nutrient flows in arable crops, 2012.
- Invited scientific adviser to the Australian Government's Reef Rescue Program on investment priorities, 2008.
- Technical Consultant to the Crop Water Productivity and Irrigation Water Use Efficiency Program of the International Atomic Energy Agency, 2005-2006.
- Member of the National Committee of the National Program for the Productive Use and Rehabilitation of Saline Lands, 1996-1999.

- Queensland representative on the Murray Darling Basin Commission, Irrigated Catchments Standing Committee, 1994-1996.

Workshops/symposia chaired

- Co-chair of the organising committee of iCROP-2016, an international symposium on crop modelling, Berlin, March 2016
- International workshop on *Representing the effect of SOM on soil function in farming systems models*. Brisbane, February 2014.
- Session on *Sensitivity, uncertainty and analysis of error in process-based agricultural and ecosystem simulation models*, in the MODSIM2013 Conference. Adelaide, December 2013 (with Dr V Snow).
- Workshop on *Farming systems to minimise greenhouse gas emissions: Interactions and tradeoffs moving from paddocks to whole farms*, in the International Conservation Agriculture Congress. Brisbane, September 2011 (with Dr V Snow).
- International workshop on *Modelling soil-based greenhouse emissions in agricultural systems*. Brisbane, May 2009.
- National symposia on *Management of nitrogen fertiliser in the Australian sugar industry*. Townsville, March 2002. Brisbane, May 2006. Townsville, May 2008.
- Invited co-chair of the *Crop Modelling stream, 15th International Nitrogen Workshop*. University of Lleida, Spain. 28-30 May 2007
- International workshop on *Sugarcane physiology 2003: Integrating from cell to crop to advance sugarcane production*. Brisbane, September 2003 (with Drs G. Inman-Bamber, G. Bonnett, and M. Smith).
- National workshop on *Agroforestry over shallow water tables: The impact of salinity on sustainability*. Melbourne, May 1997.

Editorial positions

- Associate Editor of *Agronomy for Sustainable Development*, 2018-present.
- Associate Editor of *Frontiers of Environmental Science*, 2015-present.
- Member of the Editorial Board of *Agriculture, Ecosystems & Environment*, 2015-present.
- Review Editor for *Frontiers of Plant Nutrition*, 2010-present.
- Member of the Consulting Editorial Board, *Sugar Tech* Journal, 2008-present.
- Associate Editor of *Agronomy Journal*, 2012-2014.
- Member of the Publications Committee, Australian Society Sugar Cane Technologists, 1998-2007.
- Guest Editor/Co-guest Editor:
 - European Journal of Agronomy 2018 (Vol 100).
 - European Journal of Agronomy 2017 (Vol 88).
 - Environmental Modelling and Software 2014 (Part I Vol 62, 326-516. Part II Vol 72, 274-444).
 - Agriculture Ecosystems and Environment 2013 (Vol 180)
 - Field Crops Research 2005 (Vol 92, 2-3)
 - Irrigation Science 2003 (Vol 22, 3-4)
 - Agricultural Water Management 1999 (Vol 39, 2-3)

PhD students graduated and current

- Amy Beavan, PhD, "Nitrous oxide emissions of biochar-compost mixtures", James Cook University, in progress.
- Karen Benn, PhD, "Barriers to sugarcane farmers adopting management practices to reduce impacts on the Great Barrier Reef", James Cook University, 2013.

- Elizabeth Meier, PhD, “The availability of nitrogen in GCTB soils in the wet tropics and its impact on productivity / profitability: A systems analysis”, University of Queensland, 2007.
- Viki Cramer, PhD, “Water and nitrogen dynamics of *Casuarina glauca* and *Eucalyptus camaldulensis* planted over shallow saline water tables”, University of Queensland, 1999.
- Xiandeng Hu, Ph.D., University of New England, Centre for Water Policy Research, 1994-1995