

# TOM FARRELL INSTITUTE ANNUAL REPORT

2015/2016

Regional Solutions for a Sustainable  
Future

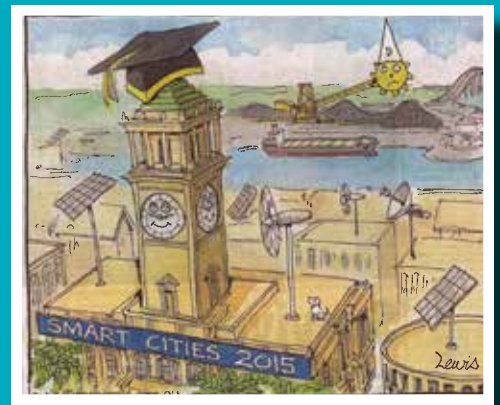


## Vision:

Regional solutions for a sustainable future.

## Mission:

- Be a centre of excellence in environmental research and its application
- Build University and community partnerships to meet the environmental challenges of the future
- Advance the development and application of environmental knowledge
- Integrate cultural, social and economic values into environmental solutions

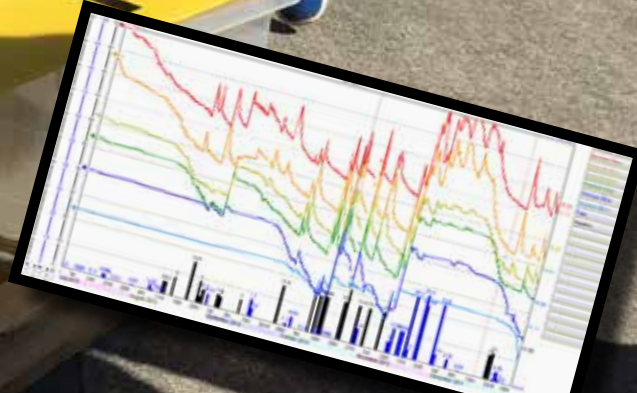
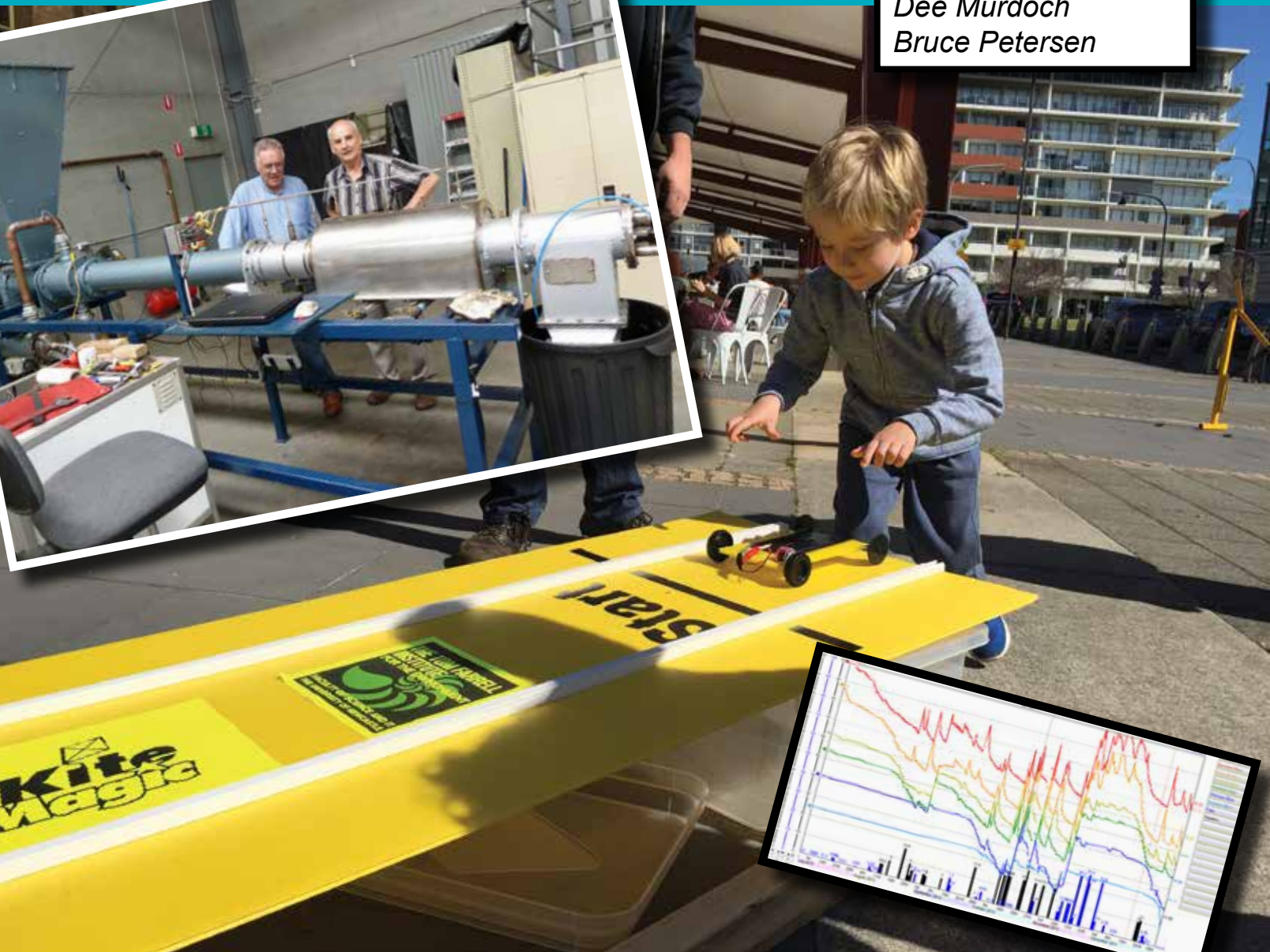
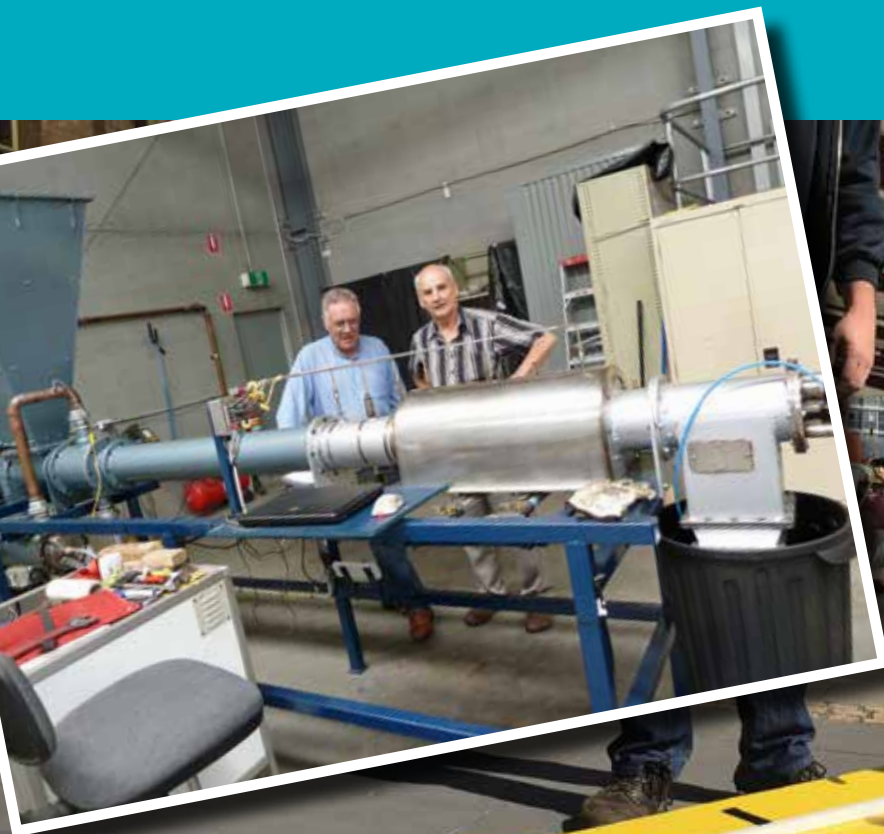


## Advisory Board

*Cameron Archer*

*Dee Murdoch*

*Bruce Petersen*





## About Us

The Tom Farrell Institute for the Environment is led by Prof Tim Roberts and staffed by a team of five experienced environmental sustainability researchers, teachers and communicators. The TFI has national and regional links with industry, government and community as well as strong connections within the University of Newcastle and the higher education sector.

Each team member plays an active role in fostering relationships within these spheres and developing projects that have multiple functions such as enhancing biodiversity and ecological resilience, environmental education for schools, and community engagement initiatives. As an advocate for sustainable solutions, often to complex problems entrenched in vexed and unsustainable practices, we are in a politically neutral but powerful position to innovate new paths to a resource efficient and environmentally sustainable future.



## Report from the Director

It is my pleasure to write a few words about the development of our activities throughout 2015 and 2016. Exciting times with significant growth in our research and development activities and new international linkages forged with colleagues in Czech Republic and Namibia. We are currently working with Newcastle City Council, Port Stephens Council, Steripak Pty Ltd, Fodder King Pty Ltd, Star Water, EC Sustainable, CORE, Xstrata Coal and Introspec Consulting, RedSkink, CiAgent & EnviroPacific Services, Permeate Partners, OZGREEN, Conservation Volunteers Australia, Muswellbrook Shire Council, and Wetland Care Australia.

My congratulations to Peter Stevens for his excellent research thesis entitled "Evaluating an Asymmetric Microrelief System Designed To Secure Soil, Water And Biocapacity In Eroded, Degraded And Modified Peri-Urban Landscapes" which passed examination with flying colours. One of his examiners commented "I cannot commend the thesis more highly for its originality, thoroughness, and clarity.

It is the most carefully prepared and substantively significant submission that I have evaluated in a number of years. The thesis should be published as (a) a university text and (b) practitioner's handbook".

Further good news for Dani Lloyd-Prichard who as a result of her presentation on the use of bees as monitors of biodiversity at the Singleton Mine Rehab conference in 2015 has been awarded a significant research grant from Glencore to continue her studies at Ravensworth mine.

In an effort to bring environmental sustainability issues to the community I have continued with

my weekly environmental talks on 2NURFM and in early 2015 I began a regular column in the Newcastle Herald. In some ways an onerous task to meet deadlines each week but generally a satisfying way to garner new knowledge. Feedback has been very favourable and this in itself is encouraging.

I am pleased to report that the three on-campus student clubs that I have initiated, Newcastle University Student Environment Club, Nuni Toastmasters Club and Callaghan Landcare Group, are thriving. It is a real pleasure to work with such students. One can rest assured that the world will be in good hands in the future.

In 2015 I was invited to speak at "Forest Rehabilitation Post Open Cut Coal Mining" conference, Banjarmasin, South Kalimantan, Indonesia. This was a fascinating and informative visit to the tropical rainforests of Borneo where coal is mined in a similar open-cut fashion as in the Hunter Valley and the rehabilitation tasks are made even more difficult by the acid forming soils and the tropical deluges. The visit led to us inviting mine rehabilitation and reforestation expert Didik Triwibowo to our 2016 Mine Rehab conference. He presented a description of his awesome successes in reforesting the Adaro mine which produces 50,000,000 tonnes of coal per year!

My thanks to the wonderful team at TFI. Each day is a pleasure to be at work with them.

Professor Tim Roberts,  
Director

## Our Team



### **Professor Tim Roberts**

#### Director

Professor Tim Roberts is the Director of The Tom Farrell Institute for the Environment.

Professor Roberts took up the position of Director, following the completion of his tenure as Dean of Research at JCU Singapore. His previous tenure was as inaugural Dean of the Singapore campus of the University of Newcastle, Australia.

In line with his appointment as Conjoint Professor in Biology he continues to be active in research in the laboratory of his long-time collaborator, Associate Professor Hugh Dunstan, at the University of Newcastle. He has published 100 papers.

Professor Tim Roberts' researcher profile [www.newcastle.edu.au/profile/tim-roberts](http://www.newcastle.edu.au/profile/tim-roberts)



### **Dr Steven Lucas**

#### Project Director

Steven has over 10 years of experience in sustainable water (and soil) management and has contributed to the development of water systems understanding. Dr Lucas has been involved in:

- Analysis of centralised and decentralised water supply systems, wastewater treatment systems and stormwater systems and developing sustainable approaches to sourcing fit-for-purpose water at the point-of-use and integration of available mains water, rainwater, stormwater and wastewater systems, and water quality, irrigation practices and soil/water dynamics

Dr Steven Lucas' researcher profile [www.newcastle.edu.au/profile/steven-lucas](http://www.newcastle.edu.au/profile/steven-lucas)



### **Dr Gary Ellem**

#### Project Director & Conjoint Lecturer

Dr Gary Ellem received his PhD in Biophysics from the University of Newcastle, and followed on to lecture in Biology and Ecology. His recent work has focussed on modelling and analysis of the scale and economics of alternative energy, sequestration and land management systems, as well as the development of innovative biomass technologies such as microalgae. His doctoral studies were focused on the biophysics of shell shape in molluscs and he holds IP in a number of fields including radio position finding techniques, the thermal processing of biomass and photobioreactor design for the mass cultivation of microalgae. Dr Gary Ellem's researcher profile [www.newcastle.edu.au/profile/gary-ellem](http://www.newcastle.edu.au/profile/gary-ellem)



### **Danielle Lloyd-Prichard**

#### Project Officer

Creative and results-driven engagement professional with an 18-year record of achievement in coordinating, developing, promoting, delivering and evaluating environmental sustainability programs across the Northern Territory and Hunter Region of Australia. Excellent skills in communicating, inspiring and motivating others to implement simple solutions to complex environmental issues using a hands-on, lead by example management style which fosters a culture of teamwork, shared mission and dedication to excellence and the environment.

Danielle Lloyd-Prichard's staff profile [www.newcastle.edu.au/profile/danielle-lloyd-prichard](http://www.newcastle.edu.au/profile/danielle-lloyd-prichard)

## Our Team



**Belinda McNab**  
Executive Officer

Belinda has been with the TFI since soon after it began in 2006. A highly experienced professional, Belinda is responsible for ensuring the smooth day-to-day running of the Institute and its various functions, including staff supervision, financial management, event management and graphic design. She is a passionate graphic designer and has a number of years' experience using her skills to assist advertising and marketing for various events that the Institute holds. Belinda has extensive experience in event coordination and management, and has been instrumental in bringing our many events such as forums, conferences and large scale shows to fruition.



**Nigel Stace**  
Project Officer

Nigel is a proactive and dynamic member of the Tom Farrell Institute team. Nigel commenced with the Institute in 2014 in the role of events coordinator. He is instrumental in pulling together our two major conferences that are held each year, as well as assisting with our Hunter Valley Electric Vehicle Festival.



**Latha Lewis**  
Project Officer

Latha is a graduate Chemical Engineer with a Master of Environmental Studies from the University of Newcastle. She has broad work experience in environmental management, having previously worked for Newcastle City Council and the UoN as well as in consultancy. She is now a Project Officer at the TFI, organising the annual Hunter Valley Electric Vehicle Festival (HVEVF).



**Peter Stevens**  
Project Officer

Qualified in Architecture and Environmental Management, with thirty years of experience in design and land management, Peter has recently completed RhD studies in stemming soil erosion and securing water in Australian landscapes using a micro topographic system demonstrated at the UoN between 1992 and 1996.

Peter lectures in the School of Architecture and Built Environment Master's program on Disaster Preparation and Sustainability.



## Our Team



### **Margaret Williams**

#### **Volunteer**

The TFI is fortunate to have the volunteer support of Margaret one day a week. Duties include checking information for funding but not applying for the funds. Other duties tend to be variable depending on what is necessary. These duties could include photocopying, laminating, making booklets and the general tasks needed in an office.



### **Naomi Keenan**

#### **Project Officer**

Naomi has recently completed her Masters in Environmental Management at the University of Newcastle. She has a highly-organised nature, with a wealth of experience in administrative functions, project management, as well as editorial work.

Naomi came to the Institute in 2015 to support the administrative and community engagement functions of the business. Her work at the Institute has been reflected in the success of our events including the successful launch of the Tom Farrell Biography, A Powerhouse of a Man, Hunter Valley Electric Vehicle Festival, Smart Future Cities conference, as well as the Mine Rehab conference and associated mine tours. We wish her well in her new role with NSW Office of Environment and Heritage.



### **Karolina Wrobel**

#### **Project Officer & Volunteer**

Karolina is an intrepid young person intent on an environmental career. She left her native Poland as a teen to pursue this dream. She has made a significant contribution to the TFI and now works for Sydney Water. We hope she returns to TFI in the future.



### **Thanh Ba Ho**

#### **Research Associate**

Thanh Ba (Ba) is a lecturer from Nong Lam University, HCMC, Vietnam. His interest is microbial application for environmental treatment. Ba holds a Master of Applied Science degree from RMIT University (2010), and now is a PhD candidate at the Tom Farrell Institute for the Environment. Ba's research focuses on using *Achaea* to degrade modified polystyrene in landfill and collect methane as a clean energy source.

## Our Team



### **Martin Babakian**

#### **Consultant Meteorologist / Conjoint Lecturer**

With 40 years' experience in Meteorology and Project Management in the aviation and marine industry, Martin can rapidly identify problems, formulate tactical plans, initiate change and implement effective strategies in challenging and diverse environments.

Mr Babakian has lectured in Meteorology in the Southern California Safety Institute, USA, as well as in Aviation Meteorology at the University of Newcastle.



### **Dr Cameron Archer AM**

#### **Conjoint Professor**

Dr Archer completed a PhD on the environmental history of the Paterson Valley and remains very interested in the history and future of the Hunter region. He has served, and continues to serve on a number of local state and national boards relating to agricultural education, regional development and heritage conservation. Cameron has been a long time member of the Paterson Historical Society.

Cameron played a key role in the creation of the Primary Industries Education Foundation Australia, a national not-for-profit company dedicated to increasing learning about Food and Fibre Production in Australian schools. He is currently chair of the board of that organisation.



### **Pam O'Sullivan**

#### **Consultant Mycologist / Conjoint Fellow**

Pam has vast experience and expertise in mycology and is the highly respected author of field guides to East Coast fungi. She brings this expert knowledge to the TFI fungi research projects.

*"Generally there is an extreme paucity of knowledge and information about our native fungi - there are many thousands of fungi just in our area alone that have yet to be identified. Species lists are few and far between and not comprehensive. As mycologists retire they are very rarely being replaced. Courses on mycology are very few and limited. Identification and research into species in our region alone has been very patchy or non-existent".*



### **Dr Caroline Veldhuizen**

#### **Conjoint**

Caroline spent ten years as an economic researcher and presenter, and also worked on the Hunter Research Foundation's regional wellbeing project. She received her Doctorate in early 2016 after completing a thesis which examines the connections between 'innovation' and social and ecological sustainability. The urgent need to reconsider what we define as innovation emerged from the work. Caroline's ongoing interests concern the connections between democracy, the 'good life' and bringing about positive, sustainability focused change.



### **Dr Patrice Newell**

#### **Conjoint**

Dr Patrice Newell is a recent PhD graduate from the University of Newcastle and her research has been very much aligned with the interests of the Tom Farrell Institute in the area of sustainable land use and the application of biochar soil amelioration and to the problem of global warming. Patrice is working with Peter Stevens on restoring the biological - hydrological sequence of a degraded landslip area to secure deep rooted vegetation cover.

## Research Projects & Activities

- Bees as monitors of biodiversity - using pollen analysis to determine flora in rehabilitating mined land. Funded by Glencore at Ravensworth Coal Mine near Singleton
- Biodigestion of modified polystyrene in landfill— in association with Summerhill Waste Management Facility and funded by Steripak
- Water sensitive urban design and rehydration of farm lands in association with:
  - NCC at Summerhill Waste Management Facility
  - Peter Andrews Natural Sequence Farming
- Soil quality monitoring and beneficial reuse of CSG production water (Research Partner: Fodder King Ltd)
- Investigating the use of recycled organic and mineral waste as reactive filter media for improving stormwater quality (Research Partner: Star Water)
- Undertaking dissolution tests on a range of coal types with respect to “Environmentally Hazardous Substance (EHS)” classification as per MARPOL Annex V (Research Partner: Xstrata Coal and Introspec Consulting)
- Using smart-meters to determine diurnal water use patterns to provide improved modelling inputs to simulate integrated water cycle management (Research Partner: RedSkin)
- Investigating the efficacy of polymer filters in removing hydrocarbons from industrial runoff (Research Partner: CiAgent & EnviroPacific Services)
- Investigating the fouling characteristics of various types of membranes used in wastewater treatment in order to improve efficacy (Research Partner: Permeate Partners)
- Ecology research in the Minmi area funded by the Donaldson Conservation Trust (DCT):
  - vegetation mapping study with Callum Vizer
  - Bird surveys entered into the Atlas of Living Australia
  - Fauna mapping study (Honours project of Kieran Marshall)
- Stepping Stones project supported by the Biodiversity Fund (Research Partners: OZGREEN, Conservation Volunteers Australia & Muswellbrook Shire Council).
- Newcastle Riparian-Ramsar Connections project supported by Australian Government (Research Partners: WetlandCare Australia, NCC & Conservation Volunteers Australia).
- Event-based stormwater runoff monitoring and analysis to characterise catchment runoff – mainly for sediment and nutrients
- Water sensitive urban design
- Landcare activities on Callaghan Campus
- TKR Invited speaker at “Forest Rehabilitation Post Open Cut Coal Mining” conference, Banjarmasin, South Kalimantan, Indonesia September 2015.



**The Tom Farrell Institute**  
for the environment presents...

**Willow short-rotation coppices in the maintaining of local biodiversity in agricultural landscapes**

**Professor Mariola Wrobel**  
Department of Botany and Nature Protection at West Pomeranian University of Technology (Poland)

Professor Wrobel's research and teaching interests include botany and phytosociology, environmental natural protection, ecological restoration of degraded areas and biology of energy plants. She received her PhD in environmental management and protection at Academy of Agriculture in Szczecin (2004) and postdoctoral degree in agroecology at the Institute of Technology and Life Sciences in Warsaw (2015). Her recent work has focused on the role of energy plants in maintaining of local biodiversity in the agricultural landscape and biological restoration of soil lands. She is a member of the Polish Botanical Society, the Scientific Council of the Odra National Park and the Regional Council of Nature Protection in Szczecin (West Pomerania).

Professor Wrobel's research interests:

- botany and phytosociology
- agroecology
- restoration of degraded lands, and
- biology of energy plants

Venue: Life Sciences Theatre, University of Newcastle Callaghan Campus  
Date: 11 April 2016  
Time: 12:30pm  
RSVP: <http://bit.ly/1Zm2CFM>  
Cost: FREE  
\*Please allow sufficient time to find a park

[www.tomfarrellinstitute.org](http://www.tomfarrellinstitute.org)

**FREE SEMINAR**

**How Truffles + Animals Impacted Australian History**

Jim Trappe from Oregon State University  
<http://www.ozf.org/100newscities/seminar.php>  
Todd Elliott from the backwoods  
<http://toddelliott.wesley.com/>

"The Australian eucalypt forest systems have evolved independently of the coniferous forests of the Pacific Northwest. But they and their various components – trees, fungi, animals – function much the same!"

**Event Details:**  
Thursday 30 June  
Advanced Technology Centre, ATC210 (Theatre) University of Newcastle Callaghan  
5.30pm - 8.30pm  
**FREE TO ATTEND**

When not conducting studies of mycorrhizae, mentoring students, and participating in truffle-related activities, Jim Trappe writes books on fungi. The beautifully photographed, full-color Field Guide to North American Truffles: Hunting, Identifying, and Enjoying the World's Most Prized Fungi, by Matt Trappe, Fran Egan, and James Trappe, was published by accident by scientists and chefs alike in 2007.

Todd Elliott has published and named several new species of fungi in the scientific literature. He has been invited and has participated in mycological expeditions in Thailand, China, Cameroon, Mexico, to the heart of Australia and North America (he is a certified wilderness first aid responder and plays that role in these expeditions in addition to his mycological skills). He has been invited to speak on fungi that provide insights at the annual meeting of the North American Mycological Association and, as a result was invited to do the same at the San Francisco Mycological Society.

[www.tomfarrellinstitute.org](http://www.tomfarrellinstitute.org)

**SMART FUTURE CITIES 2015**  
Presented by the NSW Government  
NEWCASTLE, 9-9 OCTOBER

1-3 OCTOBER  
NEWCASTLE CITY HALL  
NEWCASTLE, NSW, AUSTRALIA

**THE TOM FARRELL INSTITUTE**

Newcastle Wetland Connections  
Using Native Plant Species

**Bush Tucker Planting**

University of Newcastle Callaghan Campus  
Meet at the fire pit behind Sirabahn Building  
10.00 am – 12.30 pm  
Tuesday 19 April 2016

Get involved in Green Week!  
Come and join the Callaghan Landcare group and indigenous students to plant bush tucker plants along the Sirabahn Trail.

How much? Nothing! Just bring yourself!

**Delicious free morning tea!**

To register and find out more contact Jessica Soper  
Phone 081 400 022 or email [bsi-callaghan@newcastle.gov.au](mailto:bsi-callaghan@newcastle.gov.au)

**THE TOM FARRELL INSTITUTE**



## Grants & Sponsorships Awarded

Hunter Local Land Services  
Community Education Grant - 2015 & 2016 - \$1500

Bee Industry Development Project  
(Dept of Industry)- \$17925

Trial of alternative surface water  
treatment system via research  
partnership and consultancy  
agreement (NCC) - \$16000

Bees as Biodiversity Monitors Project  
(Glencore Ravensworth) - \$17500

Smart Future Cities Conference  
Support (NCC) - \$10897 (cash) and  
\$10000 (in-kind)

Hunter Valley Electric Vehicle Festival  
(PWCS - 2015) \$10000

Smart Future Cities (Newcastle Now)  
\$5000

Hunter Valley Electric Vehicle Festival  
(PWCS 2016) - \$10000

Beneficial reuse of mined landscape  
for renewable energy development  
(OEH) - \$2500

Hunter Valley Electric Vehicle Festival  
(Port of Newcastle 2016) - \$15000

Mine Rehabilitation Conference  
(Department of Industry 2016) -  
\$10000

Designing performance based  
reactive filter media products (EC  
Sustainable 2015) - \$100000

Investigating the beneficial use of  
compost as landfill capping (SUEZ)  
\$10,000

Richmond Vale Rail Trail development  
(Donaldson Conservation Trust 2016)  
\$83,000

Caring for our Country (CFOC)  
2013-2017 Foundation activities  
- Total budget across the plan  
\$1,684,323

## Committees

Tim Roberts is an active member of:

- Hunter Science Hub Executive
- Environmental Advisory Committee of Newcastle City Council
- Great Eastern Ranges Hunter Steering Committee
- Hexham Swamps and Kooragang

Island Rehabilitation Committee

- Our Green Corridor Coalition Executive
- Cycle Safe Network bid to bring \$100 million active transport network of bike tracks and walking tracks to Newcastle/ LMCC in partnership with Heart Foundation, Property Council of Australia

## Conference Organisation 2015

- 5th Annual Best Practice Rehabilitation of Mined Lands Conference, March 2015. 300 delegates
- 5th Annual Electric Vehicle Festival Waste to Energy Workshop September 2015 with CRC-CARE. 45 persons participants
- Smart Future Cities 2015 Conference, October 76 speakers 250 delegates
- Hunter Koala Management Workshop- November 2015

## 2016

- 6th Annual Best Practice Rehabilitation of Mined Lands Conference, 7 April 2016 with funding support from NSW Dept Industry, NSW OEH,.
- 6th Annual Electric Vehicle Festival August 2016

## Other Forums and Activities

- Cessnock dry forests and bird diversity: the Regent Honeyeater story (forum)
- Negotiating the local marine environment. Marine protection, planning and the blue economy in Scotland - International visiting fellow Dr Tavis Potts (Forum)
- Launch of "A powerhouse of a man - Tom Farrell (1904-1996)
- Smart Future Cities conference
- Biodiversity Day - Bluegum Hills Regional Park
- Visiting academics Jim Trappe from Oregon State University and Todd Elliott from backwoods led

an expedition to seek out fungi in the Barringtons

- Mapping soil microbial diversity in Australia: a first approximation. Dr Elizabeth Bui, CSIRO (forum)
- How truffles + animals impacted Australian history. Jim Trappe and Todd Elliott (forum)
- Willow short-rotation coppices in the maintaining of local biodiversity in agricultural landscapes. Prof Mariola Wrobel, University of Technology Poland (forum)
- Hunter Koala Management Workshop. Koalas in the Hunter: status, threats and extinction.
- Careers in science and environmental science expo, Rutherford Technology High School

## University Campus Activities

- Leading a committee to develop a business case for converting the Callaghan Campus to 100% renewable energy use by 2020. Business case to be presented to the University Committee for Environmental Sustainability by June 2016.
- Electric vehicle building competition as a means of recruiting interest in STEM subjects in 2016, in partnership with AIM High and ME program
- Living Green column 300 words Newcastle Herald every Monday (98 columns so far)
- 2NURFM five minute presentation every Tuesday (235 talks since March 2011)
- Uni Callaghan Landcare Student Club Mentor since starting the Club in 2014: Club has planted over 2500 plants on campus.
- Newcastle University Environment Club Mentor since starting the Club in 2011.
- Nuni Toastmasters Club Mentor since starting the Club in 2012
- Annual Don Morris Walk event
- TFI completes signage around the Don Morris Walk

## Report on Stepping Stones Project \$2.7 million 2011-2017

This project is funded by the Australian government and is carried out in partnership with OZGREEN Muswellbrook Council and Conservation Volunteers Australia

Over 35 landholders now undertaken stepping stone projects on their properties (approx. 70% within the DCT boundary and the remaining 30% in adjacent, connected areas, such as Mt Vincent and Brunkerville)

Since the conception of the project approx. 340 hectares of private land in the lower hunter has been either revegetated, reconnected and restored, equating to over \$300,000 grant funding spent. In addition, over \$25,000 cash has been contributed by the private land owners to their projects, A further estimated \$35,000+ has been contributed

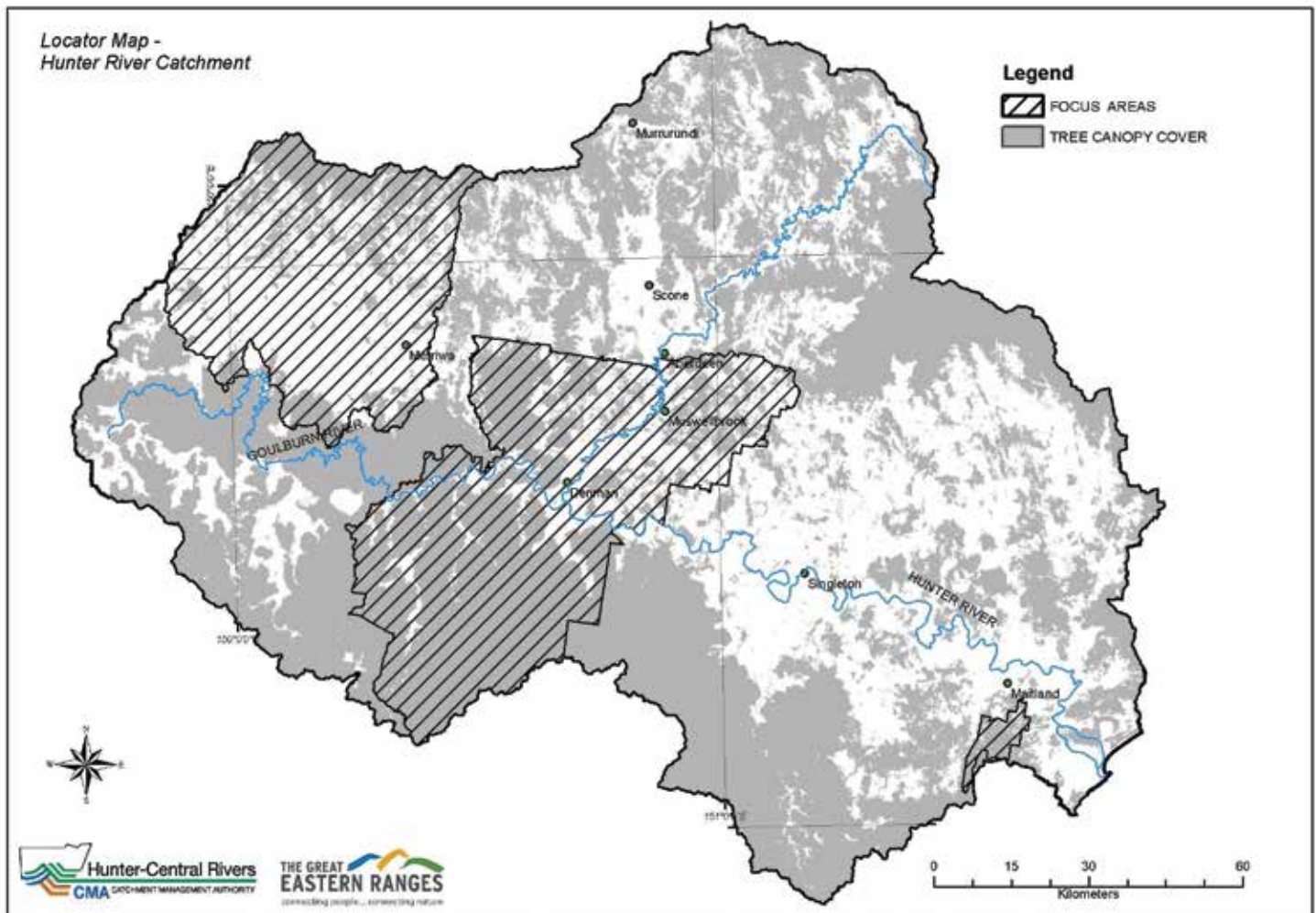
in-kind by private landowners (includes; fencing, site preparation and planting/weeding activities)

A large majority of the projects (approx. 90%) within the Lower Hunter have been restoration (weeding) activities to date, of the remaining 10% of projects, revegetation works have accounted for over 4,000 stems.

Bird excursions continue to be popular across the region.

An annual stakeholder forum, bringing together industry partners from environmental planning and management fields to talk about private land conservation, was held at Quorrobolong on November 18, 2015 with approx. 40 attendees.

The Stepping Stones project is focussed in three priority areas. In 2015 Lower Hunter Focus areas expanded beyond the Donaldson Conservation Trust to include areas north of the Hunter River such as Dungog, Vacy, Lambs Valley. This expansion recognised the importance of these areas in strengthening the Watagans – Myall Lake – Bulahdelah corridor connections.





# Report on Bee Research Activities

August 2014 – March 2015

Assessment of the pollination services for the threatened species *Grevillea parviflora* subsp. *parviflora* by the native social stingless bees *Tetragonula carbonaria*

This research was sponsored through the Lake Macquarie Environmental Research Grants Scheme. Lake Macquarie City Council and various sponsors fund this Scheme. The 2013 - 2014 Sponsors were: Delta Electricity, Glencore - West Wallsend Underground, and Eraring Energy.

The potential role of the Australian social stingless bee *Tetragonula carbonaria* in the pollination services of the threatened species *Grevillea parviflora* subsp. *parviflora* was examined using palynology techniques and field observations in bushland locations of west Lake Macquarie, New South Wales.

Managed hives of *Tetragonula carbonaria* were placed in four sites

and samples of honey and propolis were collected from the hives and analysed for the presence of *Grevillea parviflora* subsp. *parviflora* pollen.

*Grevillea parviflora* subsp. *parviflora* pollen was detected in all propolis samples from the four study sites but was not found in the honey samples.

This study was a pilot project for the application of native stingless bees in the monitoring of floral diversity. It demonstrated the potential to use propolis samples to quantify plant species richness and the presence of specific species relevant to conservation within a foraging area.

The results of this project were presented as a one minute snapshot at the 2015 Mine Rehab conference, it was picked up by media and several mines showed interest in using bees for monitoring. Ravensworth Open Cut mine granted \$36000 to run a trial on site over the 2015/16 Spring Summer seasons.



Threatened species *Grevillea parviflora* subsp. *parviflora*



Internal nest structure of a *Tetragonula carbonaria* hive

## Publications and Presentations

- Ellem, G. (2015). "Peak fossil fuel won't stop climate change - but it could help." from <http://theconversation.com/peak-fossil-fuel-wont-stop-climate-change-but-it-could-help-38023>.
- Ellem, G. (2016). "Carbon capture and storage is unlikely to save coal in the long run." from <http://theconversation.com/carbon-capture-and-storage-is-unlikely-to-save-coal-in-the-long-run-54182>.
- Ellem, G. (2016). Electric dreams for the transport of Newcastle. Newcastle Herald, 9 May 2016.
- Ellem, G., et al. (2015, 27th February 2015). "Four ways to boost Australia's economy that can help the climate." The Conversation. from <http://theconversation.com/four-ways-to-boost-australias-economy-that-can-help-the-climate-38106>.
- Ho, T. B., Roberts T., Lucas S. (2015). Small-Scale Household Biogas Digesters as a Viable Option for Energy Recovery and Global Warming Mitigation—Vietnam Case Study. 3rd International Conference - Sustainable Agriculture, Food and Energy (SAFE 2015). Ho Chi Minh City, Vietnam.
- Ho, T. B., Roberts T., Lucas S. (2015). "Small-Scale Household Biogas Digesters as a Viable Option for Energy Recovery and Global Warming Mitigation—Vietnam Case Study." Journal of Agricultural Science and Technology 5: 387-395.
- Lloyd-Prichard, D., Roberts T., Lucas S. (2016). "Assessment of pollen assemblages from the hives of *Tetragonula carbonaria* for the presence of the threatened species *Grevillea parviflora* subsp. *parviflora*." Journal of Pollination Ecology 18(4).
- Love, E., Lucas S., et al. (2015). Improving Stormwater Treatment Using Engineered Filtration Media. Stormwater 2016. Gold Coast.
- Lucas, S., et al. (2016). "Putting the bio back in bio filtration." Retrieved 12 December 2016, from <http://www.insidewaste.com.au/general/opinion/1049913/putting-bio-bio-filtration>
- Mohr, S. Ellem G, et al. (2015). "Projection of world fossil fuels by country." Fuel 141: 120-135.
- Moore, A. and P. O'Sullivan (2016). A guide to the common fungi of coastal New South Wales, Department of Primary Industries.
- Murdoch, D. and T. Roberts (2015). Rehabilitation futures for coalmines in the Hunter Valley. CleanUp 2015, Melbourne, VIC.
- Roberts, T., et al. (2015). "Recruiting power of Hunter valley electric vehicle festival: Electric vehicle competition: 2011-2015." Science Education News 64(1): 65-66.
- Roberts, T., et al. (2016). Moving your campus Smartly to 100% renewable energy. 16th International Australasian Campuses Towards Sustainability (ACTS) Conference., Sunshine Coast, QLD.
- Stevens, P. R. (2016). Biological capacity as the basis for disaster risk reduction in Australian towns and cities. Safe Cities Conference Melbourne.
- Stevens, P. R. (2016). Watering Country - a new land use planning paradigm to secure clean water, fertile soil and a climate moderating biomass across tenure. Australian Regional Development Conference. Canberra.
- Stevens, P. R., et al. (2015). Life on mars: Using micro-topographic relief to secure soil, water and biocapacity. 9th International Water Sensitive Urban Design (WSUD 2015) and the 3rd International Erosion Control Conference, 20th October 2015. Sydney: 505.
- Zillig, L. J., Roberts TK, Lucas S, (2015). "Mining Rehabilitation in New South Wales (Australia) and Germany." Journal of Earth Science and Engineering 5: 499-511.

## Congratulations to Kieran Marshall

*for his First Class Honours Thesis on Fauna of the Richmond Vale Rail Trail*

Kieran undertook an exhaustive and intensive study of the diversity of mammals along the Richmond Vale Rail line in Sugarloaf ranges connecting Minmi to Kurri. His work involved animal trapping and release studies along three sections of the disused line to compare mammalian diversity by vegetation habitat type. The project would investigate three different woodlands: Kurri Sands Woodland Swamp – located in the lowlands west of the Sugarloaf range; Red Gum Forest - located on the Western Slopes of the Sugarloaf Range; and Blue Gum Forest - located on the Eastern Slopes of the Sugarloaf Range.

Data from 45 spotlighting hours, 90 camera trap days, 2700 terrestrial Elliot trap nights, 216 cage trap nights and 810 arboreal trap nights was used to identify mammalian assemblages and compare between these vegetation communities.

This study revealed a low diversity and abundance of arboreal mammals within the Smooth Apple Bloodwood and Riparian Blue Gum communities. The finding was primarily attributed to the lack of hollow bearing trees due to past silviculture practices. Habitat degradation due to fire frequency, illegal timber collection and forestry practices as well as predation by red fox (*Vulpes Vulpes*) were identified as key threatening processes impacting the diversity and abundance of mammals. However a significant population of the threatened Squirrel Glider *Petaurus Norfolcensis* was discovered within the Kurri Sands Swamp Woodland.



## Electric Feel - EVF 2016

The sun demonstrated its power in full force as though to show support for all the solar powered vehicles at the annual Hunter Valley Electric Vehicle Festival at Cameron Park this weekend; Australia's Largest and most comprehensive EV festival. The Festival is unique in not only its sheer size, but its push for primary and secondary aged students to become more involved in Science, Technology, Engineering and Maths (STEM).

Whilst displaying a range of vehicles currently on the Australian market, the festival also has a competitive element in the form of the mini EV prize which encourages primary school children to build and race solar powered vehicles in a demonstration of dexterity, and the EV prize which sees high school students build and race an EV whilst learning about forefronting technologies and representing their school.

As a product of the Festival, Hunter TAFE developed a course in CERT III ELECTRONICS, which demonstrates the sheer impact the festival has on the community and its participants.

Professor Tim Roberts, Director of the Tom Farrell Institute which developed the festival notes a significant interest in STEM since the birth of the HVEVF in 2011.

"Each year we continue to receive positive feedback from parents and teachers involved in the festival that say they've seen an improvement in student engagement at school as a direct result of the event," Professor Roberts said.

### Solar Spring School for High School Science at the UoN's Centre for Organic Electronics

The winning teams of the Tom Farrell Institute's 2015 Electric Vehicle (EV) Prize in the Design Innovation and Entrepreneurs category were given scholarships to attend a one day workshop organised by the Centre for Organic Electronics (CoE) at the University of Newcastle.

The students, ranging from years 7 to 12 were an enthused audience asking many technical and practical questions about science as well as about the pathways available to them to get involved in research at the University. Professor Paul Dastoor, the CoEs director, gave the students attending a warm and inspirational introduction asking them to work on the big problems in the world and showing them that even in a small coastal city like Newcastle they can affect change on a global scale.

The CoE, a part of the Australian National Fabrication Facility (ANFF), focuses on the scientific challenges in the development of organic photovoltaics for the next generation of environmentally friendly energy sources, photonics and biosensors.

After morning talks on the science of organic solar cells the students got hands on with the equipment used to make the cells in the physics building, creating films 1000 times thinner than a human hair with a spin coater. PhD candidates Coralie Epstein and Gareth Sciffer spoke to the students about their journey from high school to the CoE. Demonstrations of scanning Helium microscopy, organic ink-jet printing

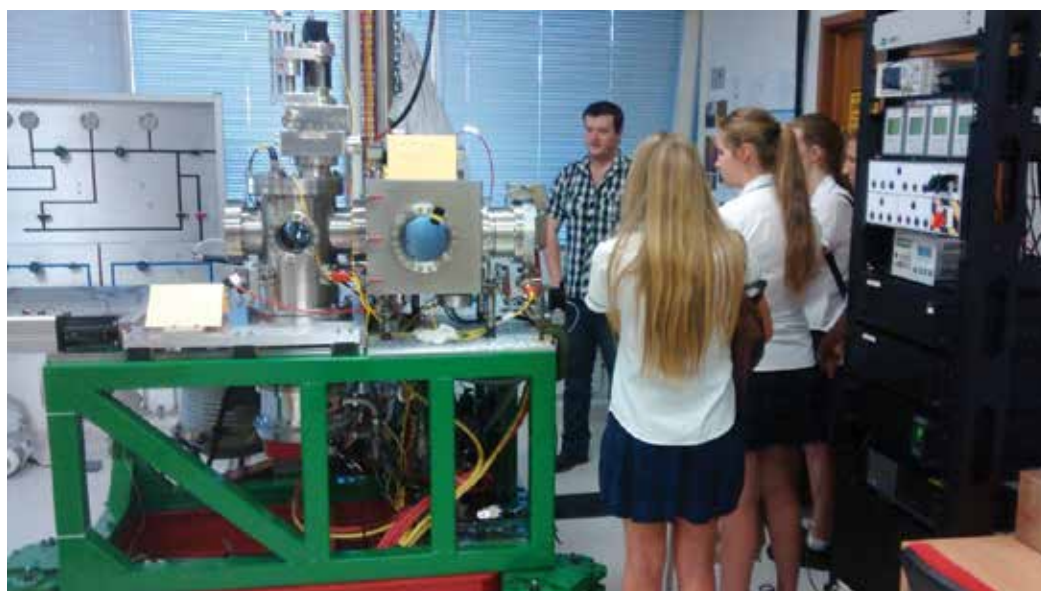
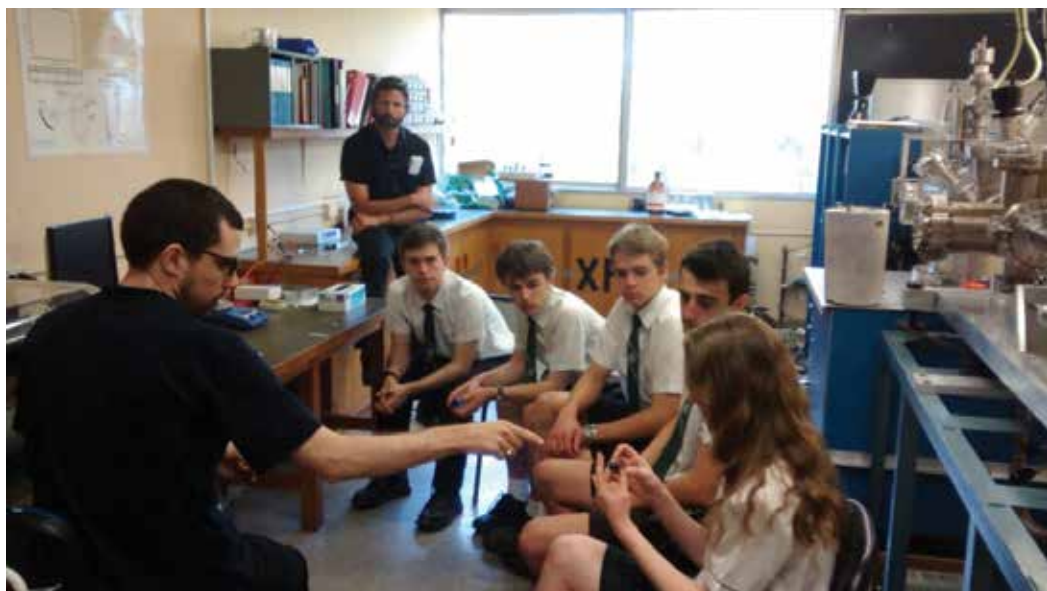
and other techniques also captivated the students. In the afternoon the CoE's pilot scale roll-to-roll (R2R) production facilities at the Newcastle Institute for Energy and Resources were on display, with each student taking home a sample of the large scale solar modules being developed using the R2R equipment.





*Students from Macquarie College and their Teacher experimenting on a spin coater assisted by Dr Krishna Feron.*

*Students from Bishop Tyrrell Anglican College and their Teacher working with Dr Daniel Elkington from the CoE on the ink-jet printer. The students created a simple image which was then printed using a conductive silver ink, similar to that used in the organic solar cells and biosensors being developed at the CoE.*



*Students from Maitland Grossman High School learning about the building of a scanning helium microscope from Adam Fahy. This new microscopy technique being developed at the CoE is ideal for very sensitive samples, such as the thin polymer layers in organic solar cells.*



## Tom Farrell Book Launch

*A Powerhouse of a Man. Tom Farrell (1904-1996). A community champion.*

In 2011, the Tom Farrell Institute approached Dr Chris Mooney, an author who had previously co-authored a book with John Ramsland (Remembering Aboriginal Heroes), to produce a biography of Rolf Everist (Tom) Farrell.

"I can honestly say I hadn't heard of him", Chris said. A whole new admiration grew out of his research of Tom Farrell, for the man who helped transform the face of Newcastle and beyond.

Chris admitted that he enjoyed researching for this book. Finding out that "Tom and Joe Richely had an almost spiritual commitment to the environment. They wouldn't have been comfortable with the label of 'greenie'. Tom understood that everyone deserved the right of access to green areas; it led to harmony within a community."

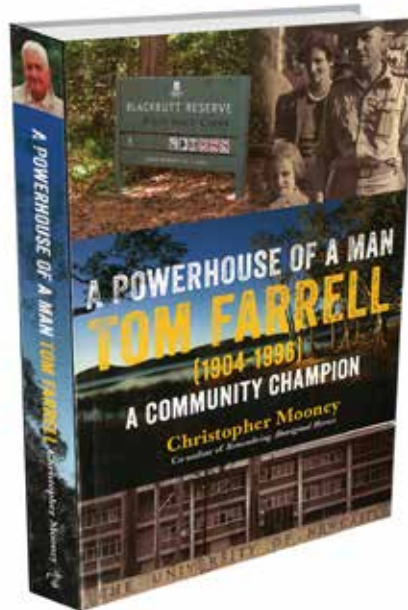
Assisted by the 5 children of Tom and Kath Farrell made the research and gathering of information so much easier. Each of the family members were proud to assist with the information, sharing pictures and memories of their childhood, holidaying around the lake.

In 2014 the book was finalised and sent to print.

In July 2015, the Tom Farrell Institute held a very successful book launch for A Powerhouse of a Man, Tom Farrell (1904-1996).


With all of the Farrell and extended families in attendance, plus dignitaries such as the University of Newcastle's Chancellor Mr Paul Jeans, John Ramsland and Doug Lithgow, and all other special guests, we and over 150 people helped make the launch of this wonderful biography a great event.

Special thanks goes to Dr Christopher Mooney, all the extended family of Tom and Kath Farrell and Brolga Publishing for making this biography a reality.




The Tom Farrell Institute for the Environment cordially invites you to the **book launch** of

**A Powerhouse of a Man**  
**Tom Farrell**  
 1904-1996  
**A Community Champion**  
 by Christopher G Mooney



**Date:** 30th July 2015  
**Time:** 6:00pm for 6:30pm - 8:00pm  
**Venue:** The Atrium, the Industry Development Centre, University of Newcastle, University Drive, Callaghan  
**RSVP:** 17 July 2015 to Naomi Keenan via naomi.keenan@newcastle.edu.au or 02 49218699

*canapés and refreshments will be served during the course of the evening*

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# Hunter Great Eastern Ranges Partnership

## The Hunter Valley in context

The Tom Farrell Institute is an integral contributor to the Hunter sector of the Great Eastern Ranges Initiative which is bringing people and organisations together to protect, link and restore healthy habitats over 3,600 kilometres from Western Victoria through NSW and the ACT to Far North Queensland. The initiative is a strategic response to mitigate the potential impacts of climate change, invasive species, land clearing and other environmental changes on our richest biodiversity and iconic landscapes. From social, economic, biodiversity and connectivity conservation perspectives the Hunter Valley is one of the most complex areas of the Great Eastern Ranges.

The Hunter region contains a diverse range of unique and rich ecosystems. Due to a natural gap in the Great Eastern Ranges at the head of the Hunter Valley, it's one of only three areas on the eastern seaboard of Australia where inland ecosystems extend to the coast. The Hunter Valley represents a significant east-west linkage of natural vegetation in the Great Eastern Ranges, with the potential for north-south 'stepping stones' of vegetation to allow species movement.

Since non-Indigenous settlement the area has become increasingly degraded and fragmented and is at increasing risk due to rapidly expanding agricultural, industrial and urban

development. The landscape may be placed under additional strain as a substantial proportion of the valley floor is earmarked for coal exploration and possible mining over the next 30–50 years.

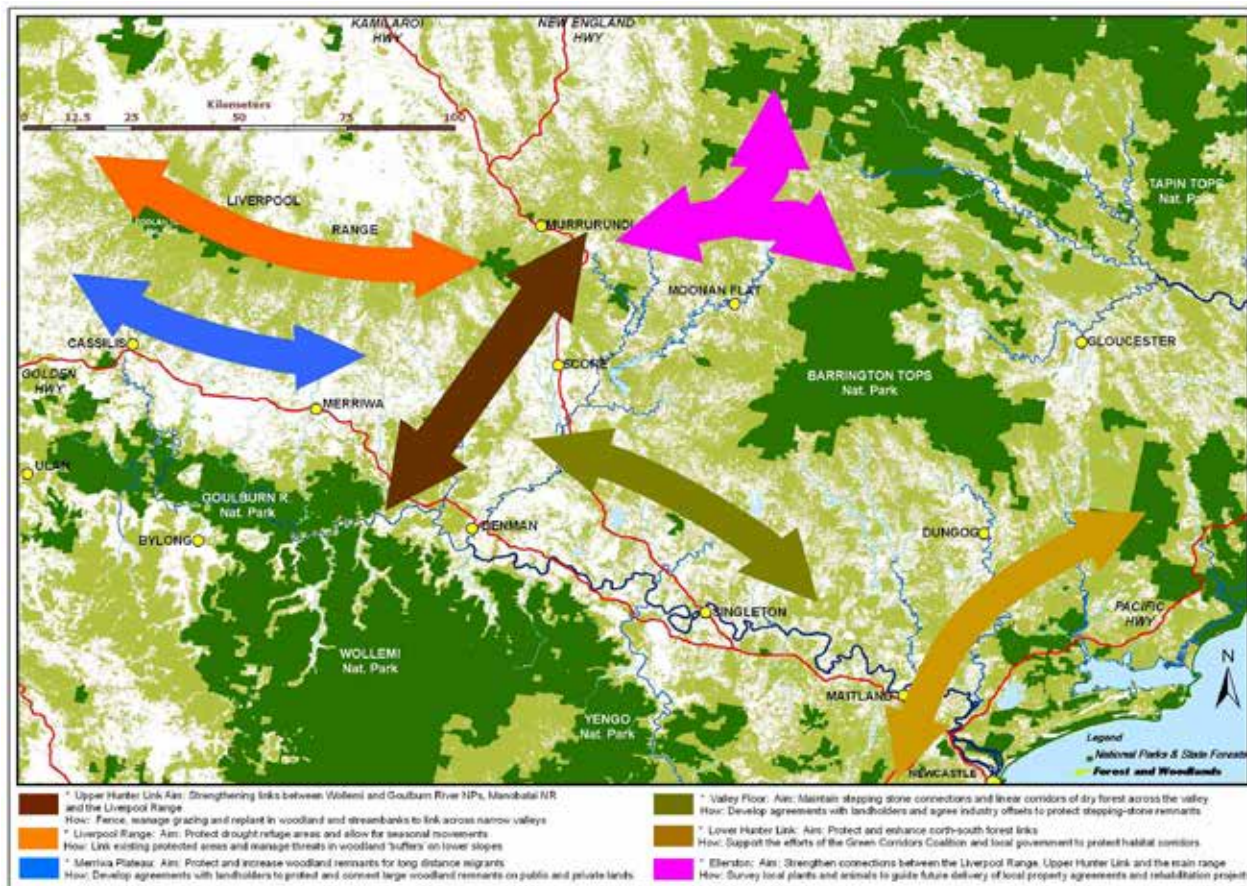
Formed in 2007 the Hunter Great Eastern Ranges (GER) Partnership Committee have worked for land, water and biodiversity conservation, restoration, education and sustainability outcomes in the Hunter Valley region of New South Wales.

The Tom Farrell Institute joined the Committee in 2010 and has contributed strongly to the success of the Hunter GER through funding through the Stepping Stones project.

The Hunter Great Eastern Ranges Partnership covers the Hunter Valley, as defined below.

## Our Partners in HunterGER

- OzGREEN
- The Tom Farrell Institute for the Environment (University of Newcastle)
- Conservation Volunteers Australia
- Hunter Local Land Services
- NSW Office of Environment & Heritage
- Landcare Upper Hunter & Scone Landcare (& farming sector)
- BirdLife Australia
- Wanaruah Local Aboriginal Land Council
- Hunter Region Landcare Network
- Hunter Coal Environment Group
- Cameron Archer (Individual)
- Muswellbrook Shire Council
- Singleton Shire Council
- Upper Hunter Shire Council





## Report on Koala Workshop convened by TFI on 13/11/15

Recently the TFI brought together 40 researchers, carers and regulators to review what is known and what needs to be known and done to ensure that koalas do not become extinct in our region.

The Hunter Koala Preservation Society reported that in Port Stephens there was a decline in the population as observed by the number of injured animals being presented. The number one cause for admitting koalas to care facilities was traumas from motor vehicles, followed by unsuitable environment and then dog attacks and chlamydia and other diseases.

Some 40 koalas are microchipped every year by this group in order to keep track of the population but there was no clear estimate of how many koalas existed in the region. This

lack of knowledge of population size was a common theme throughout the day.

The agreed conclusion from the workshop was that the long term survival of koalas in the Port Stephens area would best be achieved by the population being declared endangered, such a declaration being predicated on knowing more exactly how many koalas are in fact in the region. A classic Catch22 conundrum.



*Photograph supplied by Don Hudson and used here with his permission*

## Tom Farrell Institute forms Green Partnership with Elite Cycle Racing Team

Late in 2016 Tom Farrell Institute for the Environment at the University of Newcastle officially announced its new partnership with elite international cycle team Oliver's Racing with the aim of reducing the impact the team's activities have on the environment. The long term goal of Oliver's Racing is to achieve carbon-neutrality as an organisation, in line with the goals of their major sponsor Oliver's Real Food franchise. The role of the

TFI will be to advise on actions the team can undertake to achieve this sustainability goal, such as sourcing ethically and sustainably produced uniforms, using biodegradable water bottles, carpooling to races, and participating in carbon-credit schemes.

We will also use our partnership with the Oliver's Racing to continue to promote sustainable activities to the general public, because we believe the future of the environment

is in everyone's hands, through the choices we all make every day. We believe encouraging people to make even a small change, for example choosing to walk or ride for a short journey, preparing a vegetarian dinner once a week, reducing paper waste, choosing energy-efficient appliances, letting clothes dry naturally, buying fruit and vegetables that are in season, and recycling, can make a huge difference.



## Ever expanding international connections

The past two years have seen the research connections of the TFI expanding across the world to almost all continents: Africa, Asia, North America, India and Europe and led to the growth of our research into rehabilitation of lands and environmental sustainability and will lead to fruitful bilateral projects.

- Professor Mariola Wrobel, Department of Botany and Nature Protection, West Pomeranian University of Technology, Poland.



- Professor Miroslav Svitek, Dean, Faculty of Transportation Sciences, Czech Technical University, Prague, Czech Republic



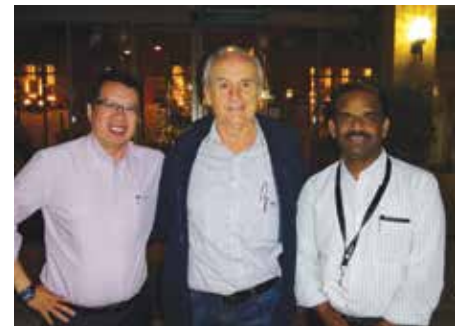
- Professor Dr Yudi Firmanul Arifin, Vice Rector, Universitas Lambung Mangkurat (UNLAM), in Banjarmasin, South Kalimantan, Indonesia
- Professor Jim Trappe, Department of Forest Science, Oregon State University, Corvallis, Oregon, USA



- Mr Didik Triwibowo, Adaro Mine, Central Kalimantan, Indonesia



- Dr Ibo Zimmermann, Deputy Director, Agriculture and Natural Resources Sciences, Namibia University of Science and Technology, Windhoek, Namibia
- Dr Tavis Potts, Senior Lecturer in Human Geography, Department of Geography and Environment, University of Aberdeen, Aberdeen, Scotland



- Dr Charles Lee, University of Newcastle Singapore Campus
- Dr SPM Prince William, National Environmental Engineering Research Institute, Nagpur, India





# Director speaks at International Summit on Derelict Mines held in Singleton 2016

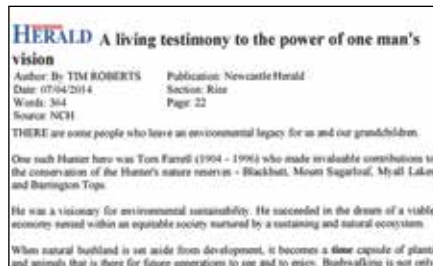
Professor Tim Roberts delivered a keynote address at the prestigious gathering of experts from across Australia, Canada, USA and UK. His subject was "Derelict mines: ownership past, present and future. "A derelict mine is one that no longer has an owner, but indeed it is in fact "owned" by the community of that area. That community was associated with that landscape before it was disturbed and lives with the disturbance presently and into the future. Similarly the government has moral ownership of the derelict mine as it had been party to approval, and implantation of the mine through licencing, taxing, and royalty collection.

The socio-cultural legacies of abandoned mines are intimately intertwined with the environmental legacies which are often all too visible. Communities endure and the derelict mines whilst inducing solastalgia in the individual generations that lived through the active mine life; offer in some cases opportunities for new use of the landscape and in other cases an enduring environmental hazard."



## Newcastle Herald and 2NURFM

The Institute has maintained strong media activity through 2015 and 2016 through the Director's weekly interview on 2NURFM and his weekly column for the Newcastle Herald focusing on environmental sustainability. The first column and the latest column are pictured below and right.



Some of the titles of the Herald articles:

- Endangered parrot makes Hunter its second home
- A balance is needed for foxes, cats, truffles and trees
- Biodiversity's importance is in our sights this month
- Splitting the sugarbag and reaping the golden nectar
- Warning: disasters are likely to be the new normal
- Connecting green patches proves wildly beneficial
- Walking and cycling cemented in region's plan
- Singapore's system delivers for the people
- We all feel the sting when thought is lacking
- Digesting the facts about our greatest recyclers
- Blockchain a win-win for community power trade
- Making sure 'added value' keeps on giving
- Abandoned mines a disturbing legacy
- A living testimony to the power of one man's vision
- Artworks capture glories of nature

**2016 INTERNATIONAL SUMMIT ON DERELICT MINES**  
**Dealing with Derelict Mines**  
 6-8 December 2016, Singleton NSW

**New risk-based management approaches to dealing with problems, issues and policy challenges**  
 6-8 December 2016, Singleton Diggers, York Street, Singleton NSW 2330  
 (welcome reception on the evening of 6 December followed by two full days)

**Co-hosts and major sponsors**

**Registration fees**

- Early bird (until 30/9/2016): \$450 (incl GST)
- Standard (1/10/2016 to 30/11/2016): \$500 (incl GST)
- Late / on the spot (after 30/11/2016): \$550 (incl GST)
- Students: \$200 (incl GST)

**Derelict mines**

There are over 50,000 derelict mines in Australia, which are largely the legacy of a time when environmental legislation was either non-existent or in its infancy. This summit will encourage participants to explore how to implement a more economically sustainable, risk-based management approach to dealing with mining contamination.

**Derelict mines pose potential risks to human and environmental health.** The summit will examine the nature of derelict mines, short- and long-term risks to sensitive receptors, tools for monitoring and prioritising risks, and technological advances for rehabilitation. The event will also focus on guidance for and policies on managing derelict mines in Australia.

**The NSW Government has identified nearly 400 derelict mine sites in NSW, only a small fraction of which have been rehabilitated.** Comprehensive rehabilitation is one of the most challenging problems confronting not just NSW but also Australia and the rest of the world. The cost of rehabilitating derelict mine sites using current approaches and technologies is prohibitively high, as a result many remain unattended and a threat to human health, the environment and agriculture.

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- Breakthrough for renewable energy
- Halt the march of cane toads
- Plan needed for human overload



TFI Director Prof Tim Roberts with Dave Cochrane from 2NURFM

**HERALD Abandoned mines a disturbing legacy**  
 Tim Roberts  
 3 Dec 2016

Since time immemorial, the mining of the earth's riches has been a universal and necessary function of societies across the world. The situation has been no different in Australia, from the workings that yielded the mine again implements of the indigenous peoples, through to the sandstone quarries of the First Fleet, the shafts of the gold rushes, and most recently the huge excavations of coal mining.

Unfortunately, the abandonment of the mine once the resource has been exhausted has been common practice, with close-up, restoration and reinstatement of the landscape left to the communities who inhabited the space pre-mining.

With some 50,000 derelict mines in Australia, the impact on these communities is manifold. From innocuous holes in the ground used for recreation and often viewed as historic relics, a disturbed land prone to sinkholes and subsidence, through to highly dangerous toxic and acidic leachate emitters as was seen with the Nye Creek, mining leaves its mark on the land and communities. It is only in recent decades that rehabilitation requirements have been enshrined in legislation.

A derelict mine no longer has an owner, but through its legacy, it is indeed "owned" by the community of that area. These communities associated with the landscape before it was disturbed, live with the impacts now and into the future. But the government also has moral ownership of the derelict mine, having been party to approval and implementation of the mine through licensing, taxing and royalty collection.

The socio-cultural legacies of abandoned mines are intimately intertwined with their environmental legacies.

All will be explored at this week's Derelict Mines Conference in Singleton.

Professor Tim Roberts is the director of the Tom Farrell Institute for the Environment University of Newcastle



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