

POULTRY
RESEARCH
FOUNDATION



THE UNIVERSITY OF
SYDNEY

ANNUAL REPORT 2013

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GOVERNANCE STATEMENT

The Poultry Research Foundation recognises the importance and benefit of reviewing its adoption and alignment with governance principles and provides the following report

Principle 1 – Lay solid foundations for management and oversight

- Nature of the entity:
The Poultry Research Foundation is a part of the University of Sydney (ABN 15 211 513 464) and not separately incorporated under a State or Commonwealth Act. The Foundation is required to gain prior approval for its fundraising activities from the appropriate University delegate. The Foundation's activities are not-for-profit and covered by the DGR status of the University of Sydney. The University is exempted from the requirement to hold an Authority to Fundraise and obligations upon holders of such an authority but is still required to comply with the balance of provisions of the Charitable Fundraising Act.

- Roles of board / council and management:
The Foundation operates under the authority of the Senate of the University of Sydney, as approved in June 2011, and has no powers of delegation. The Foundation conducts its affairs pursuant to the Foundation Rules and the relevant policies of the University.

Principle 2 – Structure of the council to add value

The Council of the Foundation in 2013 consisted 17 members. (refer to page 7)

Council members were elected at the Foundation's AGM on 6th April, 2011. There is not a separate nomination committee of Council. The full Council resolves on nominations for co-opting of members to fill vacancies outside of the process of election at the AGM. There was not a performance evaluation of the Council undertaken in the reporting period.

Principle 3 – Promote ethical and responsible decision-making

Council members have been provided with the University of Sydney Foundation Governance Guide, Foundation Rules, Code of Conduct, Work Health & Safety policy and the External Interests policy. All these policies are available on the University's Policy Register, as are other relevant University policies regarding harassment, grievance procedures and the Delegations of Authority.

Principle 4 – Safeguard integrity in financial reporting

The annual accounts of the Foundation are prepared by the financial staff of the University, signed off by the Director of the Foundation and included in this Annual Report to the Senate. The Foundation is part of the University and therefore does not have its own audit sub-committee. While the Annual Financial Report of the University is audited by the Audit Office of NSW, the Annual Accounts of the Foundation have not been audited.

Principle 5 – Make timely and balanced disclosure

The Foundation complied with the reporting and disclosure requirements of the Senate. These include an annual budget and this Annual Report

Members and Council have been made aware of the processes for disclosure

pursuant to the Code of Conduct, External Interests policy, which include protected disclosure to the ICAC, to the Ombudsman or to the Auditor General.

Principle 6 – Respect the rights of shareholders, members, staff, volunteers, clients & other stakeholders

The Foundation Council and/or membership consists of invited industry professionals, industry bodies and University representatives, whose input is invited via the Annual General Meeting and Council meetings of the Foundation. Each year the Foundation conducts a General Meeting in Oct/Nov and the AGM in April/May.

Principle 7 – Recognise and manage risk

The Foundation recognises its activities within University premises or other premises require risks such as health and safety, environmental protection, privacy, trade practices, and compliance with the Charitable Fundraising Act to be considered and managed. The Foundation has managed these risks during the year by complying with risk management procedures as outlined by the University.

Principle 8 – Remunerate fairly and responsibly

No member of a Council is entitled to receive any remuneration for acting in that capacity except reasonable remuneration on a basis which has first been approved in writing by the University Officer (Foundations).

Members of the Foundation Council may be reimbursed for reasonable expenses after written approval of the University Officer (Foundations). Any such instances are recorded in the minutes of the Council.

FOUNDATION OBJECTIVES

OBJECTIVES OF THE FOUNDATION

The objectives of the Poultry Research Foundation are to advise the Senate of the University of Sydney and the Vice-Chancellor on matters associated with poultry research, education and scholarship within the University of Sydney and to provide an interface between the Australian poultry and allied industries and the University.

In doing so, the Foundation shall increase the resources of the University by way of membership to the Foundation and utilising benefits given by members in provision of services and other non-financial contributions.

AIMS OF THE FOUNDATION

1. To provide an interface between the poultry and allied industries in Australia and the University of Sydney.
2. To undertake research of relevance to these industries.
3. To assist in the training of scientific and technical personnel to service the private and public sectors of these industries.
4. To act in an industrial liaison capacity.

PRIORITIES 2013

1. Develop links between the University of Sydney and the Poultry CRC
 - a. Research projects
 - b. Educational programs
 - c. Postgraduate scholarships
2. Develop research projects lead by the Chair of Poultry Science
3. Complete infrastructure maintenance of the Poultry Unit
4. Promote postgraduate opportunities within the Poultry Research Foundation
5. Organise the 2014 Australian Poultry Science Symposium

Management of the Foundation is vested in a Council which comprises the President, Deputy President, Director, Faculty of Veterinary Science Dean and Provost Nominee along with elected Industry Members from the categories of Governors and Executive Members, Honorary Governors and Ex Officio Members.

The administrative office and Research Unit are based at Camden.

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University of Sydney
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Enhancing poultry performance

PRESIDENT'S REPORT



The Poultry Research Foundation is prospering due to the talent and energy of the team of researchers at Camden. The beating pulse of the Foundation is the diversity of areas being studied as described in the Directors Report. Another vital sign - membership continues to be strong. We count among our members, producers of chicken meat and eggs, a primary breeder, feed manufacturers, medication and feed additive suppliers. The membership is actively contributing ideas and several members are directly contributing time to teaching and extension activities.

The task of appointing a new Director of the PRF is proving to be difficult after the departure of Aaron in May. A global search has identified suitable candidates but at this stage, none have accepted this challenging position. We will persevere. In the interim, we rely on Dr Peter Groves as Acting Director. We thank him very much for his commitment to this role.

The Australian Poultry Science Symposium 2013 was another successful meeting. A record of almost 250 delegates attended over the course of the Symposium and we were

delighted to welcome a record number of delegates from Asia. Wonderful speakers from around the world again bought us the information so invaluable to our Industry. The symposium dinner was again a highlight of the conference aboard the "Starship Sydney" cruising the beautiful Harbour with over 170 delegates attending. Congratulations to our own Dr. Peter Groves on his receipt of the prestigious Australian Poultry Award for 2012 being presented at the symposium dinner by the President of WPSA Professor Julie Roberts for his meritorious service to the Australian Poultry Industry.

Innovation in the production of ethical, cost-effective food is essential for the prosperity of the Australian Poultry industry. The PRF is committed to this task.

Ms. Judy O'Keefe

April 2014

DIRECTOR'S REPORT

2013 started well with the 24th Australian Poultry Science Symposium. Dr Aaron Cowieson coordinated the 2013 APSS which included 76 presentations (a record for the symposium) and attracted 249 delegates. With a theme of "Enhancing Poultry Production", APSS 2013 covered important topics including the importance of calcium and phosphorus in poultry nutrition, proteases, energy and protein as macronutrients and emerging diseases affecting poultry health. We benefitted from the input of seven high quality invited speakers. There were many short communications (5 minute "speed dating" talks, as Aaron termed them) which gave the audience a wide and

comprehensive treatment of many subjects and enabled the opportunities for many of our early stage researchers to present their projects. The quality of the invited and local speakers, and from our own local and young researchers again made this Australia's premier poultry science event and its international acclaim continues. Many thanks are also owed to the depth of input from the Organising Committee and of course to the tireless and inspired activity of our Administrative Assistant, Jo-Ann Geist and her team, without whom we could not mount anything like the quality event that these symposiums prove to be.

Planning for the 2014 Australian Poultry Science Symposium occupied us heavily for much of the year, with an ambitious program to mark the 25th Anniversary and the invitation of high quality overseas and local speakers. Dr Cowieson ensured that this symposium was well organised before his departure from the faculty.

Current research projects continued, covering diverse areas including early muscle cell differentiation and fibre quality, leg weakness associated with incubation in broilers, free range layer production and behaviour studies, free range broiler production, calcium and phosphorus in broiler nutrition, Vitamin D and Strontium in commercial eggs, phytate in cereal grain digestion, modelling of feed enzyme responses with different feed ingredients, nutritional value of sorghum and effects of sodium metabisulphite, and extension of the geometric framework to broiler nutrition. Three PhD candidates have reached their final writing stages and expect to submit their theses over the next 9-12 months.

PRF staff continued to have substantial input into veterinary and veterinary bioscience degree programs. PRF staff co-ordinate 3 of the 4th year AVBS

units of study (Feed Technology, Animal Health and Intensive Animal Industries) and all units have been extremely well received by students receiving USE scores of between 4-5. PRF staff also co-ordinate 1 unit of study in the BVSc (Intensive Animal Health and Production) and 1 unit of study in 3rd year AVBS. Dr. Wendy Muir also co-ordinates the entire 4th year honours project program. PRF staff also contribute to poultry practical classes in 1st year BVSc and 4th year AVBS.

Dr Aaron Cowieson departed the PRF in May 2013 and I have taken on an Acting Director role again. Searches for a replacement have not been successful and the future of this role is uncertain at present. The resignation of Dr Stuart Wilkinson in December has also changed the academic makeup of the group and he will be greatly missed. We offer our appreciation for Stuart's valuable contribution and significant part in the culture of the Poultry Group at Camden. We know he will make an impressive and positive contribution in his new role and hopefully he will remain strongly associated with the Foundation. Maintaining an effective input into an Acting Director role is a demanding task and would not achieve anything without the enthusiastic help from the researchers and staff and students of the Foundation. I offer my deep gratitude to them for their support and encouragement throughout the year.

Dr. Peter Groves

April 2014



POULTRY RESEARCH FOUNDATION MEMBERS

GOVERNORS	EXECUTIVE MEMBERS	ASSOCIATE MEMBERS
Baiada	ADM Australia	Alltech Biotechnology
Inghams	Feedworks	Aviagen
	DSM Nutritional Products	BEC Fed Solutions
	Elanco Animal Health	Biomin Australia
	Evonik Degussa Australia	Bio Processing Australia
	Novus Nutrition	Cordina Chicken Farms
	Phibro Animal Health	Dox-al Australia
	Ridley Agriproducts	International Animal Health
	Weston Animal Nutrition	Kemin (Aust)
	Zoetis	The Egg Basket (Sales)

HONORARY GOVERNORS

Emeritus Professor E. Frank Annison

Dr. Balkar S. Bains

Dr. Derick Balnave

Prof. Wayne Bryden

Mr. John Darling

Mr. Ern Newton

Dr. Ron MacAlpine

INVITEES

The Deans of Agriculture and Natural Resources

The President, World's Poultry Science Association (Australian Branch)

The Program Manager, RIRDC Chicken Meat Program

The Program Manager, Australian Egg Corporation Ltd

A Representative, NSW Agriculture

A Representative, Poultry CRC

A Representative, Australian Egg Industry Association

The Executive Director, Australian Poultry Industry Association

PRESIDENT	Ms. Judith O'Keeffe
DEPUTY PRESIDENT	Dr. David Cadogan
DIRECTOR	Assoc. Prof. Aaron Cowieson
DEPUTY DIRECTOR	Dr. Peter Groves

GENERAL MEMBERS	UNIVERSITY COUNCIL MEMBERS
ADM Australia Pty Ltd Mr. John McLeish	Executive Dean - Faculty of Veterinarian Science Prof. Rosanne Taylor
Alltech Biotechnology Dr. Andreas Kocher	Nominee of the Provost Ms. Shauna Jarrett
Aviagen Australia Pty. Limited Mr. Peter Hanna	The Pro-Dean - Faculty of Veterinary Science Prof. David Emery
Baiada Poultry Pty. Limited Mr. Greg Hargreave	Associate Dean for Research - Faculty of Veterinary Science Assoc. Prof. Peter Williamson
Evonik Degussa Australia Mr. Ilia Mendeleil	
Inghams Enterprises Pty Ltd Mr. Greg McDonald	
Phibro Animal Health Mr. Greg Manna	
Poultry CRC Dr. Tim Walker	
WPSA President Assoc. Prof. Juliet Roberts	

POULTRY
RESEARCH
FOUNDATION
COUNCIL

POULTRY RESEARCH FOUNDATION STAFF AND STUDENTS

ACADEMIC STAFF

Assoc. Prof. Aaron Cowieson

BTechnol(Hons), PGDip, MSc, PhD
(Aberdeen)

Director Poultry Research Foundation
(Resigned in June 2013)

Dr. Peter Groves BVSc,

MACVSc(Epidemiology), PhD (Sydney)
Deputy Director Poultry Research
Foundation

Dr. Wendy Muir BScAgr, PhD

(Sydney), GradDipEd (UNE)
GradCertEducStud(Higher Education)

Dr. Jeff Downing WDA (Wagga

Agr. Col.), BSc, PhD (Macquarie),
GradCertEducStud(Higher Education)

Dr. Greg Cronin BAgSc, MAgSc

(Melbourne), PhD (Wageningen NL),
GradCertEducStud(Higher Education)

POSTDOCTORAL RESEARCH ASSOCIATES

Dr. Yumin Bao BAgSc, MAgSc (Inner
Mongolia), PhD (Armidale)

Dr. Stuart Wilkinson BScAgr,
MScVetSc, PhD (Sydney)

Dr. Mini Singh BScGen (India),
MScVetSc, PhD (Sydney)

HONORARY RESEARCH FELLOWS

Adj. Assoc. Prof. Peter Selle BVSc,
PhD (Sydney)

ADMINISTRATION STAFF

Mrs. Jo-Ann Geist

Administrative Officer

Mr. Benjamin Geist

Assistant Administrative Officer

PROJECT MANAGEMENT STAFF

Mrs. Joy Gill

Mrs. Melinda Hayter

PROJECT SUPPORT STAFF

Ms. Kate Dehon

Mr. Don Nicholson

Mr. Duwei (Wade) Chen

Mr. Ryan Hopcroft

Mrs. Jane Hibbert

POSTGRADUATE & MASTERS STUDENTS

Ms. Emma Bradbury – Ca, P and
phytase and the effects on broiler
welfare.

Ms. Linda Browning – Vitamin D, Ca, P
and phytase in poultry

Mr. Tugrul Durali – Free range broiler
production

Ms. Sonia Yun Liu – Starch and protein
digestion kinetics in broilers

Ms. Kate Hartcher – Feather pecking
in free-range laying hens

Mr. Dean Powell - Investigating the
effect of nutritional status on chicken
satellite cell fate, proliferation and
differentiation and their implications on
muscle development

HONOURS STUDENTS

(CONDUCTING THESIS PROJECTS
UNDER THE SUPERVISION OF THE
POULTRY RESEARCH FOUNDATION)

Mr Kevin Priscilla (BAnVetBioSci)
(Supervisor: Mini Singh)

'Implications of outdoor access and
nutritional intervention for free range
poultry in Australia: Use of whole grain
choice feeding to mitigate heat stress
in free range broilers'

Ms Ha Hong Truong (BAnVetBioSci)
(Supervisor: Peter Selle)

'Phytase supplementation of maize-,
sorghum- and wheat-based broiler
diets'

Ms Kelly Hickey (BAnVetBioSci)
(Supervisors: Mini Singh and Kate
Hartcher)

'Use of RFID technology to measure
range usage, performance and
behavioural characteristics in free-
range ISA Brown laying hens'

Ms Kristina Lupis (BAnVetBioSci)
(Supervisor: Aaron Cowieson)

'Nutritional value of high inulin, low
phytate wheat for broilers'

Mr Warwick Baldwin (BAnVetBioSci)
(Supervisors: Wendy Muir and Peter
Groves)

'Leg weakness in broilers'

Ms Vicky Ng (BAnVetBioSci)
(Supervisors: Wendy Muir and Peter
Groves)

'The impact of high temperatures
during late incubation on leg strength in
broilers'

Ms Shenara Somasundaram
(BAnVetBioSci) (Supervisor: Downing)
'Alleviating heat stress in commercial
ducks'

Ms Gabriella Vogt (BAnVetBioSci)
(Supervisor: Cronin)

'Welfare of free range laying hens'.

Ms Melissa Watson (BAnVetBioSci)
(Supervisors: Cronin)

'Environmental enrichment during rearing
and feather pecking in laying hens'

Ms Christine Wu (BAnVetBioSci)
(Supervisors: Cowieson)

'Calcium and phosphorus appetite
and geometric framework in chicken
nutrition'

Mr Hamish Irvine (BAnVetBioSci)
(Supervisors: Downing)

'Alleviating transport stress in
commercial ducks'

Mr Grant Purcell (BAnVetBioSci)
(Supervisor: Downing)

'Broiler production efficiency
determined as breast meat yield and
not weight gain, using ultrasound'



MEMBERSHIPS

Assoc. Prof. Aaron Cowieson:

Member: Worlds Poultry Science Association

Member: Poultry Science Association

Member: Embrex Fundamental Science Award Committee

Chair: Australian Poultry Science Symposium Organising Committee

Associate Editor: Animal Production Science

Member: Nutrition Society

Dr. Peter Groves:

Vice President: Australian Veterinary Poultry Association

President: Commercial Poultry Veterinarians (an SIG of AVA)

Adjunct Senior Lecturer: Charles Stuart University - Department Agriculture & Veterinary Sciences

Adjunct Senior Lecturer: James Cook University - Veterinary Science

Member: RIRDC Chicken Meat Advisory Committee

Member: National Newcastle Disease Technical Working Group

Member: National Avian Influenza Vaccination Expert (NAÏVE) group

Dr. Jeff Downing:

Member: Worlds Poultry Science Association

Member: Pork CRC Research and Development Committee

Member: Pork CRC Education Committee

Member: Australasian Pig Science Association

Dr. Wendy Muir:

Member: International Society of Mucosal Immunology

Member: Australian Poultry Science Symposium Organising Committee

Dr. Stuart Wilkinson

Member: Worlds Poultry Science Association

Member: Australian Poultry Science Symposium Organising Committee

Dr. Greg Cronin

Member: Editorial Advisory Board, Applied Animal Behaviour Science

Member: Australian Society for Animal Production

Associate of the Animal Welfare Science Centre

Dr. Yumin Bao

Member: Worlds Poultry Science Association

Adj. Assoc. Prof. Peter Selle::

Associate Editor: Poultry Science

Member: Australian Poultry Science Symposium Organising Committee

STAFF MEMBER- SHIPS AND AFFILIATIONS

CONFERENCE ATTENDANCE, PRESENTA- TIONS, ACKNOWL- EDGEMENTS AND AWARDS

CONFERENCE ATTENDANCE AND PRESENTATIONS BY PRF STAFF AND STUDENTS

International Production & Processing Expo: International Poultry Scientific Forum -

Atlanta, GA, USA, January 2013
Presentation by Mini Singh

Australian Poultry Science Symposium -

Sydney, Australia, February 2013
Presentations by Mini Singh, Peter Selle, Stuart Wilkinson, Kate Hartcher, Greg Cronin, Tugrul Durali, Sonia Yun Liu, and Emma Bradbury. Attended by Aaron Cowieson, Wendy Muir, Jeff Downing, Peter Groves, Yumin Bao and Linda Browning.

Feed Grain Partnership - Improving sorghum as a feed grain Seminar -

Canberra, Australia, June, 2013
Workshop by: Sonia Yun Liu
Attended by: Peter Selle

IXth European Symposium on Poultry Welfare -

Uppsala, Sweden, June, 2013
Presentations by: Peter Groves, Emma Bradbury & Kate Hartcher

European Symposium on Poultry Science -

Potsdam, Germany, August 2013
Presentations by: Sonia Yun Liu, Linda Browning & Mini Singh

Poultry Information Exchange -

Gold Coast, Australia, September 2013
Presentation by Mini Singh
Attended by: Emma Bradbury, Sonia Yun Liu

Recent Advances in Animal Nutrition -

Armidale, Australia, October 2013
Presentations by: Mini Singh and Sonia Yun Liu.
Attended by: Peter Selle

Australasian Veterinary Poultry Association Conference -

Adelaide, Australia, October 2013
Presentations by: Peter Groves and Kate Hartcher

AECL Industry Forum -

Perth, Australia, November, 2013
Presentation by: Mini Singh

ACKNOWLEDGMENTS

Thankyou to all of our research partners who funded research projects, student scholarships and post-doctoral fellowships throughout 2013:

- RIRDC
- Poultry CRC
- AECL
- Feedworks
- Danisco
- DSM
- AB Vista
- Biada

AWARDS

Australian Poultry Award 2012

(awarded at APSS 2013) -
Won by: Dr Peter Groves

John L Corbett Prize 2013 -

Won by: Sonia Yun Liu

The Poultry CRC Award 2013 -

Won by: Sonia Yun Liu



The 24th Annual Australian Poultry Science Symposium was held 17th-20th February, 2013. The Poultry Research Foundation in conjunction with the World's Poultry Science Association (Australian Branch) organised this combined meeting which presented subjects of "Calcium and Phosphorus in Poultry Nutrition" and "Energy and Protein as Macronutrients for Poultry" along with hot topic sessions on "Proteases for Poultry" and "Emerging Diseases and Poultry Health". 2013 also saw a special address by the Chairman of the Poultry CRC - Hon. John Kerin on the "Importance of the Poultry Industry". We had 8 internationally acclaimed speakers and 1 local authority who were invited to present their recent research outcomes and concepts for a crowd of approximately 249 attendees. In total, there were 76 contributed and invited speaker papers presented. This year, we steered away from e-poster presentations as they were not well received in the previous year. In order to get through such a large number of papers, there were multiple Short Communication Sessions (5 minute presentations), all of which were very well received by both

attendees and speakers. A highlight of the conference was the recognition of the career of Dr. Peter Groves when he received the Australian Poultry Award for 2012.

INVITED SPEAKERS:

Hon. John Kerin – Poultry CRC, Australia

Prof. Markus Rodehutscord – University of Hohenheim, Germany

Assoc. Prof. Roselina Angel – University of Maryland, USA

Prof. Hank Classen – University of Saskatchewan, Canada

Dr. Daniel Venne – Scott Hatchery, Quebec, Canada

Dr David Swayne – USDA Southeast Poultry Research Laboratory, USA

Prof. Stephen Simpson – University of Sydney, Australia

E. Prof. Rob Gous – University of KwaZulu-Natal, South Africa

Dr. Luis Romero – Danisco Animal Nutrition, UK

Dr. Christos Antipatis – DSM Nutritional Products Ltd., Singapore

Sponsorship of the APSS 2013 was kindly supported by:

Invited Speaker Sponsors	AECL Egg Program Poultry Research Foundation RIRDC Chicken Meat Program DSM Nutritional Products Ltd. Dupont Danisco Animal Nutrition
Gold Sponsors	Alltech Biotechnology Pty. Ltd. ADM International Poultry CRC
Silver Sponsors	Feedworks DSM Nutritional Products Ltd. BEC Feed Solutions Adisseo BASF
Bronze Sponsors	Biomim Australia Elanco Animal Health JEFO Australia Phibro Animal Health Evonik Industries
Alternative Sponsors	Taylor & Frances Evonik Industries Zoetis Australia Kemin Novus Nutrition

AUSTRALIAN POULTRY SCIENCE SYMPOSIUM 2013

FOUNDATION RESEARCH IN REVIEW

The Poultry Research Unit has been very active in both the broiler and layer research fields for more than 50 years here at Camden. Some major contributions to research and industry during this time have been in the areas of:

1. Amino Acid Digestibility Studies (RIRDC)
2. Modulation of lean tissue deposition by dietary fatty acids (RIRDC; ARC)
3. Development of a non-invasive test for stress in laying hens (RIRDC)
4. Mucosal immunity in chickens (RIRDC)
5. Nutritional and toxicological evaluation of transgenic plants (CSIRO Division of Plant Industry)
6. Application of feed enzymes (Industry)
7. Mycotoxins in poultry feeds (ADAB)
8. Egg Shell Quality (RIRDC)
9. Amino acid balance for heat stressed broilers (Industry)
10. Nutritional requirements of recently imported layer stock (RIRDC)

We will continue to serve the needs of research, industry and teaching over years to come.

CURRENT RESEARCH PROJECTS

DR. PETER GROVES:

RIRDC project 6193 was completed in 2013. This project examined variations in the temperature profiles used to incubate fertile broiler eggs and the subsequent effects on the broiler chicken's leg strength. All of the experiments included a female fast feathering parent line of the Cobb broiler. Initial studies attempted to produce poorer leg strength by

increasing incubation temperatures as measured by egg shell temperature (EST). It proved difficult to achieve consistent results. Hence we examined the overall pattern of results across eight experiments with the surprising result that we could not make leg strength deteriorate with moderate increases in EST but when early EST was somewhat lower than the accepted "ideal" EST (37.8°C), subsequent leg strength actually improved. This leads onto further research to refine optimum incubation conditions for both Cobb and Ross broilers which will be tackled in 2014 under a new RIRDC project (#8616).

DR. WENDY MUIR:

RIRDC Chicken Meat Project No: PRJ-6193 "Effects of incubation conditions on broiler chicken skeletal integrity" with senior investigator Dr Peter Groves, was completed in April 2013. Dr Groves has provided an outline of this project above.

Australian Poultry CRC Project – in association with Professor Sandra Velleman at Ohio State University and PhD student Dean Powell, "Investigating the effect of nutritional status on chicken satellite cell determination, proliferation and differentiation". Dean spent the first 6 months of 2013 in Dr Velleman's laboratory, running in-vitro assays, designed to assess the impact of nutrient status on satellite cell development, gene expression and cell fate and apoptosis. Dean returned to the University of Sydney in the second half of 2013. He has completed the experimental phase of an in-vivo experiment specifically designed to assess the outcomes observed in the in-vitro experiments during a broiler growout.

DR. JEFF DOWNING:

Continued work on the following research projects in 2013:

1. Completed and had accepted the final report for RIRDC New Animal Industries- (Project No: PRJ 003776). 'Improving the production efficiency, welfare and processing of commercial ducks.'

2. New project with Poultry CRC support 'Proteomic measures of albumen degradation as indicators of egg freshness' was started in July 2013. Currently the extraction and gel separation procedures are being developed to identify specific proteomic changes as eggs age.
3. A full research proposal has been submitted to RIRDC chicken meat 'Electrolyte supplementation of broilers prior to transport'
4. I am currently developing a research program with a game farm to investigate aspects of quail production. Work continues with funding from the Pork CRC on the induction of oestrus during lactation in sows.

DR. GREG CRONIN:

In 2013 Dr Greg Cronin commenced the second experiment in a three year project funded by AECL investigating factors in the rearing environment associated with the development of feather pecking in free range laying hens. The first experiment conducted in 2012 investigated the effects of beak trimming and environmental enrichment on the development of feather pecking. The experiment also formed the main research component of Ms Kate Hartcher's PhD research project. One main finding from experiment 1 was that birds that were beak trimmed (laser spot at day 1 in the hatchery, followed by a light trim at 11 weeks of age) had better feather plumage at 40 weeks than hens that were not beak trimmed. While there was an overall low incidence of hen deaths due to cannibalism in the experiment, treatment groups that were beak trimmed did not experience any cannibalism deaths. Environmental enrichment did not affect plumage condition or the incidence of cannibalism. In 2013 we investigated the effects of low (<5 lux) compared to normal lux (e.g. >20 lux) from day 7 to 49 of age and "stress" at 16 weeks simulating pick-up, transport and relocation in a new pen with new flock mates, compared to "No stress". Data from experiment 2 are in the process of analysis.

Greg also completed a research project funded by Australian Pork Limited and the Pork CRC to evaluate non-confinement farrowing/lactation housing systems for pigs.

DR. YUMIN BAO:

In 2013, continued investigation into prediction of the effects of carbohydrases and proteases in poultry feeds using nutritional geometry, although chief investigator Dr. Aaron Cowieson left Sydney in May. Two experiments with total 32 dietary treatments were conducted to confirm and modify prediction equations and a review paper arising out of this study has been published in *World's Poultry Science Journal*.

In 2013, Yumin also finished reporting on a commercial layer hen trial to study the effect of carbohydrates and protease on egg production, demonstrating that feed enzyme addition may improve FCR regardless of feed apparent metabolisable energy levels.

DR. STUART WILKINSON:

In 2013, Stuart continued working on the RIRDC funded project (PRJ 006015) exploring calcium and phosphorus requirements of broilers. The results of the fourth and final study investigating the effects of non-phytate phosphorus concentration on the calcium specific appetite in broilers was presented at Poultry Science Association meeting in San Diego. This project has now been completed with the final report submitted to the RIRDC. Two research papers have been published with another four in preparation.

Work has commenced on an AECL funded project (1US112) investigating the separate feeding of calcium. The first study has been completed and a scientific paper is currently in draft. The second study is scheduled to be conducted in early 2014. Stuart is continuing his Australian Pork Limited (APL) funded project investigating dietary fatty acids in growing pigs. Stuart has also been invited to become a committee member of Specialist

Group Three (Nutrition, health and Physiology) for APL.

DR. MINI SINGH:

Mini worked within a Poultry CRC project, "Improving the performance of free-range poultry production" which commenced in June 2012. This three year project aims to identify and describe the reasons for the reduced performance of broilers and layers in a free-range (FR) production system and looks into strategies for improvement in performance. So far the project has been able to assess the magnitude of response to AGP and range challenge and the interaction between the two. Grass consumption and range access were identified as principal factors for gap between free range and conventional production. Grass consumption results in dilution of energy and protein intake and may cause impaction and dietary electrolyte imbalance. Moreover, even though poultry in free-range systems have ready access to outside runs, not all birds utilize them optimally. It has been established that moderate grass intake may improve performance of broilers, perhaps mediated via functional fibre mechanisms. However, grass intake beyond 20-40g/kg results in impaired performance that appears to be independent of diet energy density. In another study it was concluded that increasing dietary energy density is a promising strategy to improve performance of free-range broilers but only if done in concert with a reduction in DEB to around 180 meq/kg, possibly due to a reduction in the nutritional interference of grass consumption and its effect on K and energy intake. Free choice feeding of wholegrain (WG) has been explored to identify the appetite of WG in FR broilers and see if provision of WG helps balance nutrient intake given the variable intake of grass (low energy, high K), can mitigate heat stress, and help develop more 'robust' GI tracts (esp. gizzard) that may improve resilience to enteric disease and/or grass consumption. In another study, range access was determined using the radio frequency identification

(RFID) system and performance and digestibility was compared for birds with high access range most with those that do not go on range at all..

ADJ. ASSOC. PROF. PETER SELLE:

In 2013, Dr Selle continued his investigations into sorghum; the enigmatic grain for chicken-meat production because of the inconsistent or sub-optimal performance of broilers offered sorghum-based diets.

The RIRDC Chicken-meat project to evaluate the inclusion of a reducing agent (sodium metabisulphite) in sorghum-based broiler diets concluded in 2013. Sodium metabisulphite has the capacity to cleave disulphide cross-linkages and their presence, especially in β - and γ -kafirin protein fractions located in the periphery of protein bodies in sorghum endosperm, are believed to be important limiting factors on protein and also starch digestion. However, during the course of the project it became evident that sodium metabisulphite has, in addition, profound effects on RVA starch pasting properties probably as a result of oxidative-reductive depolymerisation of starch polysaccharides. The inclusion of this sulphite reducing agent significantly enhanced both efficiency and energy utilisation (AME, AMEn) of broilers offered sorghum-based diets which appeared to be associated with the provision of more gradually digestible starch. Moreover, the relevant sodium metabisulphite inclusion rates promise to be economically viable.

A new RIRDC Chicken-meat project to investigate factors impacting on sorghum starch utilisation commenced in 2013. The objectives include assessments of the impact of (i) non-tannin phenolic compounds, (ii) phytate and (iii) kafirin on sorghum starch utilisation.

In addition, Peter Selle conducted contract R&D projects for several client companies involving phytase feed enzymes.



The PRF continues to collaborate with the Charles Perkins Centre and a three-year joint post-doctoral fellowship is planned to start in February, 2014 to extend the Geometric Framework to broiler nutrition. The project aims to extend the Geometric Framework (GF) for nutrition to commercial poultry nutrition and diet optimization. The primary objective is to use the Geometric Framework for the first time to understand regulation of protein and carbohydrate intake in broiler chickens. This will enable diets to be formulated to optimise multiple output criteria including meat yield and flesh quality, feed efficiency, animal health and welfare, and environmental waste.

The collaboration between the PRF and the University of Maryland in the US continues with Prof. Roselina Angel (Maryland), A/Prof. Aaron Cowieson and Dr. Stuart Wilkinson (USyd) working on calcium nutrition in broilers.

In 2013 collaboration between A/Prof. Peter Selle and a number of people from several organisations continued. These included Mr Denis McGrath (Australian Feed Grains Partnership), Dr Tom Roberts and Mr Ali Khoddami (Faculty of Agriculture and Environment), Mr Bernie McNerney (Australian Proteome Analysis Facility), Dr Robert Caldwell and Ms Jingwen Cae (Faculty of Agriculture and Environment), and Mr Greg Hargreave and Ms Robyn Surry (Baiada Poultry) in relation to various aspects of grain sorghum.

Dr. Wilkinson is collaborating with Dr. Joy Becker and the Faculty of Agriculture and the Environment on an ARC Linkage proposal involving sustainable aquaculture and hydroponics. The outcome of this application has not yet been announced.

Dr Wilkinson and Dr Downing are collaborating with Dr Josh Sweeny and Dr Bruce Mullan at the Department of Agriculture and Food, Western Australia on a project investigating fatty acids in growing pigs.

Dr. Greg Cronin is collaborating with Prof. Paul Hemsworth and Dr. Jean Loup Rault (both from the University of Melbourne) on free-range laying hen behaviour and welfare, and Associate Professor Susanne Hermes (University of New England) on research on piglet vitality and viability in pen farrowing systems.

Dr. Peter Groves is starting collaboration with Prof. Steve Walkden-Brown from UNE on Marek's Disease and is co-supervising two postgraduate students, including one at UNSW.

Dr. Wendy Muir is collaborating with Prof. Sandra Velleman (Ohio State University) on meat quality.

Dr. Jeff Downing is collaborating with Dr. Anthony Keyburn (CSIRO) on a CRC grant on a new test for poultry welfare.

Emma Bradbury completed a 6-week collaborative trial run with Nutreco in their Poultry research facilities in Spain. Research trial focused on the interaction between phytase, calcium and phosphorus in broilers with access to a separate calcium source.

Kate Hartcher visited a number of research facilities that conduct feather-pecking studies during a trip around Europe. These included: Bristol University, UK; Oxford University - FAI Farms Research Facility, UK; Belgian Institute for Agricultural and Fisheries Research, Belgium; Wageningen University (Behavioural Ecology Group), The Netherlands; Hohenheim University, Germany. Kate has also visited CSIRO in Armidale, Australia.

RESEARCH COLLABORA- TION AND INDUSTRY SERVICES

COMMUNICATIONS

PUBLICATIONS FROM PRF STAFF AND STUDENTS FOR 2013:

Bao YM, Romero LF & Cowieson AJ (2013) Functional patterns of exogenous enzymes in different feed ingredients. *World's Poultry Science Journal* **69**: 759-774

Bradbury EJ, Wilkinson SJ, Cronin GM, Thomson PC, Sacranie A & Cowieson AJ (2013) Using the geometric framework to explore calcium and phosphorus interactions and the effect on broiler welfare. *Proceedings of the Australian Poultry Science Symposium* **24**: 60-63.

Bradbury EJ, Wilkinson SJ, Cronin GM, Thompson P, Sacranie A & Cowieson AJ (2013) A geometric framework design to explore calcium and phosphorus interactions in broiler nutrition and skeletal health. *Proceedings of the IXth European Poultry Welfare Symposium, Uppsala, Sweden, June 17-21, 2013.*

Bradbury EJ, Wilkinson SJ, Cronin GM, Walk CL & Cowieson AJ (2013) Replacing limestone in broiler diets with a more digestible calcium source to improve skeletal integrity and welfare of broilers. *Proceedings of the IXth European Poultry Welfare Symposium, Uppsala, Sweden, June 17-21, 2013.*

Clark CEF, Garcia SC, Kerrisk KL, Underwood JP, Nieto JI, Calleja MS, Sukkarieh S & Cronin GM (2013) A robot amongst the herd: a pilot investigation regarding the behavioural response of dairy cows. *Proceedings of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium,*

Camden, NSW, Australia, Sept. 26-27, 2013; pp. 14-15.

Cronin GM, Tran KTN & Hartcher KM (2013) The effects of beak trimming and environmental enrichment during rearing on egg laying by free range hens during early lay. *Proceedings of the Australian Poultry Science Symposium* **24**: 188-191.

Cronin GM, Macnamara GF, Matthews RL, Barnsley JA, Williams CE, Macnamara BLF, Bøe KE & Andersen IL (2013) Voluntary feed intake by sows and weight gain by piglets in farrowing crates compared to UMB farrowing pens. *Manipulating Pig Production* **14**: 127.

Durali T, Singh M, Groves PH & Cowieson AJ (2013) Comparison of free-range and conventional broiler performance and digestibility. *Proceedings of the Australian Poultry Science Symposium* **24**: 150-153.

Fogarty ES, Manning JK, Trotter MG, Schneider DA, Bush RD & Cronin GM (2013) GPS technology and its application for improved reproductive management in extensive sheep systems. *Proceedings of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium, Camden, NSW, Australia, Sept. 26-27, 2013; pp. 25.*

Hartcher KM, Tran KTN, Wilkinson SJ, Hemsworth PH & Cronin GM (2013) Effect of rearing conditions on the development of feather-pecking behaviours in free-range laying hens. *Proceedings of the Australian Poultry Science Symposium* **24**: 192-195.

Hartcher K, Tran M, Wilkinson S, Hemsworth PH & Cronin GM (2013) Effect of rearing conditions on the development of feather-pecking behaviours in free-range laying hens. *Proceedings of the IXth European Poultry Welfare Symposium, Uppsala, Sweden, June 17-21, 2013; p 38.*

Hartcher KM, Tran KTN, Wilkinson SJ, Hemsworth PH & Cronin GM (2013) Feather-pecking in free-range laying hens: Effect of environmental enrichment and beak-trimming in rearing. *Proceedings of the IXth European Symposium on Poultry Welfare, Uppsala, Sweden, June 17-21, 2013.*

Liu SY, Selle PH & Cowieson AJ (2013) Strategies to enhance the performance of pigs and poultry on sorghum-based diets. *Animal Feed Science and Technology* **181**: 1-14.

Liu SY, Selle PH & Cowieson AJ (2013) The kinetics of starch and nitrogen digestion regulate growth performance and nutrient utilisation in coarsely-ground, sorghum-based broiler diets. *Animal Production Science* **53**: 1033-1040.

Liu SY, Selle PH & Cowieson AJ (2013) Protease supplementation of sorghum-based broiler diets enhances amino acid digestibility coefficients in four small intestinal sites and accelerates their rates of digestion. *Animal Feed Science and Technology*, **183**: 175-183.

Liu SY, Selle PH & Cowieson AJ (2013) Influence of conditioning temperatures on amino acid digestibility coefficients in four small intestinal sites and their rates of digestion in sorghum-based broiler diets. *Animal Feed Science and Technology* **185**: 85-93.

Liu SY, Selle PH & Cowieson AJ (2013) Influence of white- and red-sorghum varieties and hydrothermal component of steam-pelleting on digestibility coefficients of amino acids and kinetics of amino acids, nitrogen and starch digestion in diets for broiler chickens. *Animal Feed Science and Technology* **186**: 53-63.

Liu SY, Selle PH, Court SG & Cowieson AJ (2013) Protease

supplementation enhances apparent digestibilities of amino acids at four small intestinal sites in broiler chickens offered sorghum-based diets. Proceedings of the Australian Poultry Science Symposium **24**: 41-44.

Liu SY, Selle PH, Gill RJ & Cowieson AJ (2013) Starch and nitrogen digestion kinetics influence growth performance and nitrogen retention in red sorghum-based broiler diets. Proceedings of the Australian Poultry Science Symposium **24**: 115-118.

Liu SY, Selle PH, Gill RJ & Cowieson AJ (2013) Digestion kinetics of starch, but not nitrogen, influence nitrogen retention in red and white sorghum-based broiler diets. Proceedings of the 19th European Symposium on Poultry Nutrition, Potsdam, Germany, August 26-29, 2013.

Manning JK, Fogarty ES, Trotter MG, Schneider DA, Bush RD & Cronin GM (2013) Using GPS technology to quantify the behavioural responses of sheep during simulated dog predation events. Proceedings of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium, Camden, NSW, Australia June 17-21, 2013; pp. 37-38.

Muir WI, Lynch GW, Williamson P & Cowieson AJ (2013) The oral administration of meat and bone meal-derived protein fractions improved the performance of young broiler chicks. Animal Production Science **53**: 369-377.

Newman RE, Downing JA, Thomson PC, Collins CL, Henman DJ & Wilkinson SJ (2013) Insulin secretion, body composition and pig performance are altered by feeding pattern. Animal Production Science **54**: 319-328.

Nogueira MG, Emery D, Collins AM, Walk CL, Wilkinson SJ & Cowieson AJ (2013) The impact of dietary phytase on immune responses and

performance of pigs. Manipulating Pig Production XIV:

Nogueira MG, Emery D, Collins AM, Walk CL, Wilkinson SJ & Cowieson AJ (2013) Dietary effects of α -glucanase yeast on vaccine immune response and performance of pigs. Manipulating Pig Production XIV:

Powell DJ, McFarland DC, Cowieson AJ, Muir WI & Velleman SG (2013) The effect of nutritional status on myogenic satellite cell proliferation and differentiation. Poultry Science **92**: 2163-2173.

Singh M & Cowieson AJ (2013) Range use and pasture consumption in free-range poultry production. Animal Production Science **53**: 1202-1208.

Singh M, Thomson PC, Sheehy PA & Raadsma HW (2013) Comparative transcriptome analyses reveal conserved and distinct mechanisms in ovine and bovine lactation. Functional & Integrative Genomics **13**: 115-131.

Singh M, Durali T, Walker T & Cowieson AJ (2013) Use of alkanes in determination of grass intake for free range chickens. Poultry Science **92**(E-suppl. 1): 255. (Abstract)

Singh M, Durali T, Walker T & Cowieson AJ (2013) Are we turning chickens into cows: How much grass do free range broilers eat? Proceedings of the Australian Poultry Science Symposium **24**: 146-149.

Singh M, Durali T & Cowieson AJ (2013) Effect of grass dilution on performance and digestibility of free range chickens. Proceedings of the 19th European Symposium on Poultry Nutrition, Potsdam, Germany, August 26-29, 2013.

Selle PH, Liu SY & Cowieson AJ (2013) Sorghum: An enigmatic grain for chicken-meat production. In: "Sorghum: Production, Growth Habits and Health Benefits". (Patricia C Parra,

editor); pp 1-44. Nova Publishers Inc. Hauppauge, NY.

Selle PH, Liu SY & Cowieson AJ (2013) Steam-pelleting temperatures, grain variety, feed form and protease supplementation of mediumly ground sorghum-based broiler diets: influences on growth performance, relative gizzard weights, nutrient utilisation, starch and nitrogen digestibility. Animal Production Science **53**: 378-387.

Selle PH, Liu SY, Khoddami A, Cai J & Cowieson AJ (2013) Steam-pelleting temperatures and grain variety of finely-ground, sorghum-based broiler diets. 1. Influence on growth performance, relative gizzard weights, nutrient utilisation, starch and nitrogen digestibility. Animal Production Science **54**: 339-346.

Selle PH, Liu SY, Cai J & Cowieson AJ (2013) Preliminary assessment of including a reducing agent in 'all-sorghum' diets for broiler chickens. Animal Feed Science and Technology **186**: 81-90.

Selle PH, Gill RJ & Cowieson AJ (2013) Steam-pelleting temperatures, sorghum variety and feed form influence growth performance, nutrient utilisation and nitrogen digestibility in broiler chickens. Proceedings of the Australian Poultry Science Symposium **24**: 142-145.

Selle PH, Liu SY, Cai J, Caldwell RA & Cowieson AJ (2013) Graded inclusions of sodium metabisulphite in sorghum-based diets: 1. Reduction of disulphide cross-linkages in vitro and enhancement of energy utilisation and feed conversion efficiency in broiler chickens. Animal Feed Science and Technology **190**: 59-67.

Sutton LM, Gant LJ, Gant IK, Smith M, Cronin GM & Bush RD (2013) Using RFID technology to collect sheep liveweight data on farm. Proceedings

of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium, Camden NSW, Australia, Sept. 26-27, 2013; pp. 42.

Underwood JP, Calleija M, Nieto JI, Sukkarieh S, Clark CEF, Garcia SC, Kerrisk KL & Cronin GM (2013). **A robot amongst the herd: Remote detection and tracking of cows.** Proceedings of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium, Camden, NSW, Australia, Sept. 26-27, 2013; pp. 45-46.

van der Smagt NE, Bush RD, Trotter MG & Cronin GM (2013) **Remote sensing technologies: monitoring activity and spatial use of Merino wethers in an extensive grazing system.** Proceedings of the International Sheep Veterinary Conference, Rotorua, New Zealand, February 2013.

Williams LR, Bush RD, Trotter MG & Cronin GM (2013) **The effect of temperament on the behaviour and productivity of beef heifers grazed extensively on pasture.** Proceedings of the 11th World Congress on Animal Production, Beijing, China, October 15-20, 2013; pp. 2.

Williams LR, Bush RD, Kilgour RJ, Trotter MG & Cronin GM (2013) **The effect of temperament on the behaviour and productivity of beef heifers grazed extensively on pasture.** Proceedings of the 4th Australian and New Zealand Spatially Enabled Livestock Management Symposium, Camden, NSW, Australia, Sept 26-27, 2013; pp. 49-50.

Wilkinson SJ, Selle PH, Bedford MR & Cowieson AJ (2013) **Separate feeding of calcium improves performance and ileal nutrient digestibility in broiler chicks.** *Animal Production Science* **54**: 172-176.

Wilkinson SJ, Walk CL, Bedford MR & Cowieson AJ (2013) **Influence of conditioning temperature and the post-pellet recovery efficacy of two microbial phytases for broiler chicks.** *Journal of Applied Poultry Research* **22**: 308-313.

Wilkinson SJ, Bradbury EJ, Bedford MR & Cowieson AJ (2013) **The effect of available phosphorus on calcium appetite in broilers.** Proceedings of the 102nd Poultry Science Annual Meeting, San Diego, USA, July 22-25, 2013.

Wilkinson SJ, Bradbury EJ, Thomson PC, Simpson SJ & Cowieson AJ (2013) **Calcium and phosphorus interactions in broiler nutrition: A geometric framework approach.** Proceedings of the Australian Poultry Science Symposium **24**: 14-17.

Wilkinson SJ, Ruth, B & Cowieson AJ (2013) **Mineral composition of calcium sources used by the Australian poultry industry.** Proceedings of the Australian Poultry Science Symposium **24**: 45-48.

Wilkinson SJ, Downing JA, Thomson PC & Newman RE (2013) **Dietary fatty acids affect the growth, body composition and performance of post-weaning gilt progeny.** *Animal Production Science* **54**: 339-346.

Wilson RL, Holyoake PK, Cronin GM & Doyle RE (2013) **The evaluation of behavioural and clinical parameters in assessing weaner pig recovery on farm.** Proceedings of the International Society for Applied Ethology, Florianopolis, Brazil; June 2-6, 2013; pp. 59.

Yip JSY, Dickman CR, Denny EA & Cronin GM (2013) **Diet of the feral cat, *Felis catus*, in central Australian grassland habitats: do cat attributes influence what they eat?** *Acta Theriologica* **59**: 263-270.

INVITED PRESENTATIONS FROM PRF STAFF AND STUDENTS IN 2013:

Liu SY, Selle PH, Cowieson AJ (2013) **Dynamics of starch and nitrogen digestion influence feed conversion efficiency in broiler chickens.** Recent Advances in Animal Nutrition (RAAN), Armidale, NSW, Australia, Oct. 25, 2013.

Singh M (2013) **Nutrition and welfare of free range poultry production.** Poultry CRC Ideas Exchange, Gold Coast, QLD, Australia, Sept. 25 2013.

Singh M (2013) **A review on use of range and pasture consumption in free range poultry production.** Recent Advances in Animal Nutrition (RAAN), Armidale, NSW, Australia, Oct. 25, 2013.

Singh M (2013) **The use of range and pasture consumption in free-range poultry production.** AECL Forum, Perth, WA, Australia, Nov. 20, 2013.

Selle PH, Liu SY (2013) **Sorghum: an enigmatic grain for chicken-meat production.** Australian Feed Grain Partnership Meeting, Canberra, ACT, Australia, June 7, 2013.

Selle PH, Liu SY & Cowieson AJ (2013) **The potential for sodium metabisulphite to enhance energy utilisation of sorghum-based broiler diets.** Recent Advances in Animal Nutrition in Australia, Armidale, NSW, Australia, Oct. 25, 2013.





FINANCIAL REPORT AND STATEMENTS

2013 has been a challenging year with the departure of Dr. Aaron Cowieson midway through the year and the slow process of finding a suitable replacement. We thank Dr. Peter Groves for his continued support of the Foundation and his undertaking of the Acting Director's role yet again.

You will note from the following income statements and balance sheet, that we made a very small surplus for 2013 of \$ 810.00. Hand in hand though, Income and Expenses were down, \$324,735 and \$216,487 respectively. This is shown through Business and Investment income being down by \$151,600.00 and PRF membership by

\$10,720 and the ending of some Post doctoral support.

We are confident though that with the dedication of the staff and students within our unit here at the PRF, that we will again make it through this difficult time. All of our facilities are being fully utilised for trial work and with strong industry support we will continue to move forward.

Mrs. Jo-Ann Geist
April 2014

The University of Sydney
The Poultry Research Foundation

Income Statement
for the year ended 31st December 2013

	Notes	2013 \$	2012 \$
INCOME			
Business and Investment Income	2	370,989	488,854
Scholarships, Donations & Bequests	3	-	150,000
Memberships and Subscriptions		68,000	78,720
Symposium Income		138,695	150,823
Other Income		80,642	114,664
Total Income		658,326	983,061
EXPENDITURE			
Salaries		488,886	482,759
Consumables		28,917	84,676
Equipment and Repairs & Maintenance		64,017	119,156
Services and Utilities		17,752	13,272
Travel, Conferences and Entertainment	4	52,907	113,772
Contributions to University areas		5,036	12,060
Other Expenses		-	48,308
Total Expenditure		657,516	874,003
SURPLUS / (DEFICIT)		810	109,058
Accumulated Funds brought forward 1st January		377,242	268,185
Prior Year Adjustment	5	1,332	-
Accumulated Funds as at 1st January		378,574	268,185
ACCUMULATED FUNDS AS AT 31ST DECEMBER		379,384	377,242

I certify that the Income Statement and Balance Sheet of the Foundation have been prepared in accordance with the University's accounting practices and procedures. These Foundation accounts form part of the University of Sydney's financial reports.



Greg Robinson
Finance Director
Divisions of Natural Sciences, Engineering & Information Technologies and Business
26th February 2014

The University of Sydney
The Poultry Research Foundation

Balance Sheet
as at 31st December 2013

	Notes	2013 \$	2012 \$
ASSETS			
CURRENT ASSETS			
Short Term Investments		381,384	377,242
Total Current Assets		<u>381,384</u>	<u>377,242</u>
TOTAL ASSETS		<u>381,384</u>	<u>377,242</u>
LIABILITIES			
CURRENT LIABILITIES			
Payables		2,000	-
Total Current Liabilities		<u>2,000</u>	<u>-</u>
TOTAL LIABILITIES		<u>2,000</u>	<u>-</u>
NET ASSETS		<u>379,384</u>	<u>377,242</u>
EQUITY			
Accumulated Funds		379,384	377,242
TOTAL EQUITY		<u>379,384</u>	<u>377,242</u>

Notes to the Financial Statements

1. Accounting Policies
 - The financial statements have been prepared on a modified accrual accounting basis.
 - All fixed assets are expensed in the year of purchase.
 - Employee entitlements for Long Service Leave are held centrally in the University's accounts.
 - The University (including the Foundations) is exempt from income tax.
2. Business and Investment Income includes \$125,000 outside trial work for Poultry Research Foundation and Industry members.
3. Scholarships, Donations and Bequest Income included a one-off Donation in 2012 of \$150,000 from Danisco (UK) Ltd for Post-doc salary support.
4. Travel, Conferences and Entertainment includes costs associated with the Symposium and additional travel of students and staff for conferences.
5. Prior Year Adjustment includes CIS-issued credit of \$1,332 due to completion of the wash bay area project under Budget.



The University reserves the right to make alterations to any information contained within this publication without notice. UPS50683

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