

# Association for the Advancement of Animal Breeding and Genetics



## Proceedings of the Twenty-fifth Conference

### **Animal Breeding at the Crossroads**

Guest Editor: Susan F. Hatcher

This AAABG Special Issue of Animal Production Science contains a selection of invited papers, an accompanying volume of the 25th AAABG Proceedings containing a further 90 papers are available on the [AAABG website](#).

The University Club of Western Australia  
Hackett Drive, Crawley, WA 6009  
26–28 July 2023

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### **Refereeing of Papers**

The papers in this volume have been refereed to the journal standards. The material is subject to copyright and may not be presented elsewhere.

The criteria for acceptance of papers are that the material should address both the conference theme ‘Animal breeding at the crossroads’ and the AAABG objectives. The conference theme reflects achievements in animal breeding since the inaugural AAABG conference in 1979 and explores the role of animal breeding in a future with ever-increasing community concern for climate change, environmental impacts, animal welfare and meat consumption. Research presented in the papers must be of interest to AAABG members and industry, be sound and advances scientific knowledge in the field of animal breeding and genetics. It is also expected that one of the authors of a paper would present the material as an oral presentation at the conference.

### **Ethical Clearance**

It is incumbent upon the authors, where necessary, to have had experiments approved by a relevant animal ethics committee.

### **Authenticity**

The Journal assumes that the authors of a multi-authored paper agree to its submission. The Journal has used its best endeavours to ensure that work published is that of the named authors except where acknowledged and, through its reviewing procedures, that any published results and conclusions are consistent with the primary data. It takes no responsibility for fraud or inaccuracy on the part of the contributors. For submitted manuscripts, unpublished data and personal communications the Journal assumes that the authors have obtained permission from the data owner to quote his or her unpublished work.

### **Citation of Papers**

These papers were presented at the 25th conference of the Association for the Advancement of Animal Breeding and Genetics (AAABG) held at The University Club of Western Australia, Hackett Drive, Crawley, WA (26–28 July 2023).

Papers should be cited as:

*Animal Production Science* **63** (followed by the page numbers).

or in the abbreviated form:

*Anim. Prod. Sci.* **63** (followed by the page numbers).

## President's Message

On behalf of the organising committee, I am very pleased to welcome you to the 25th Conference of the Association for the Advancement of Animal Breeding and Genetics. We are meeting at the University of Western Australia which sits on sacred soil alongside the Derbal Yerrigan (Swan River) on Whadjuk Noongar Booja. We acknowledge that this has been a place of learning for tens of thousands of years and look forward to continuing that learning at AAABG.

The theme of our conference is Animal Breeding at the Crossroads. We will reflect on our achievements in animal breeding since the inaugural AAABG conference in 1979 and explore the role of genetics in a future with ever-increasing community concern for climate change, environmental impacts, animal welfare, and meat consumption.

A highlight of our conference will no doubt be the WA Livestock Research Council's Producer day where we aim to 'link science with farm'. We are taking the opportunity to provide a producer audience with the latest developments in animal breeding and genetics as well as showcasing emerging geneticists and launching the 2023 Farm a Friend Program. This program pairs emerging scientists with progressive farmers in a mentoring program designed to ensure science is grounded in practical farm reality and priorities. The Producer Day program will be meeting one of the major aims of AAABG, which is to 'develop communication among all those interested in the application of genetics to animal production, particularly breeders and their organisations, consultants, extension workers, educators and geneticists'.

Thank you to all our sponsors for your generous support of the conference and an enormous thank you to all members of our organising committee and the conference organising team from Conference Design. Finally, thank you to Dr Sue Hatcher, AAABG Editor and AAABG Executive Officer, for putting together these proceedings.

We hope you enjoy your time in Perth and take the opportunity to interact and network with students, researchers, and producers from all corners of the animal-breeding community.

Bronwyn Clarke  
*President*

## Twenty-fifth AAABG Conference Committee

President	Bronwyn Clarke
President Elect	Jason Archer
Secretary	Caris Cornwall
Treasurer	Johan Greeff
Editor	Sue Hatcher
Ordinary Committee Members	Mark Henryon Kylie Munyard Beth Paganoni Esther Price Phillip Vercoe
Professional Conference Organiser	Conference Design <a href="mailto:mail@conferencedesign.com.au">mail@conferencedesign.com.au</a>

## AAABG Presidents

Year	Name	Conference location
1979	J. S. F. Barker <sup>A</sup>	UNE Armidale, NSW
1981	J. S. F. Barker	UM Melbourne, Vic.
1982	R. Hawker	UQ Brisbane, Qld
1984	R. Hawker	UA Adelaide, SA
1985	J. James	UNSW Sydney, NSW
1987	R. R. Howe	UWA Perth, WA
1988	J. Nivison	UNE Armidale, NSW
1990	N. Clarke	Hamilton & Palmerston North, New Zealand
1991	T. Liley	UM Melbourne, Vic.
1992	J. Vercoe	UCQ & CSIRO Tropical Cattle Research Centre, Rockhampton, Qld
1995	P. England	UA Roseworthy, SA
1997	R. Barlow	Dubbo, NSW
1999	B. Sandilands	Mandurah, WA
2001	D. Garrick	Queenstown, New Zealand
2003	A. McClintock	Melbourne, Vic.
2005	H. Burrow	Noosa Lakes, Qld
2007	J. van der Werf	UNE Armidale, NSW
2009	W. Pitchford	Barossa Valley, SA
2011	J. Greeff	UWA Perth, WA
2013	H. Blair	Napier, New Zealand
2015	M. Goddard	Lorne, Vic.
2017	T. Reverter	Townsville, Qld
2019	K. Bunter	UNE Armidale, NSW
2021	F. Brien	UA Online
2023	B. Clarke	UWA, Crawley, WA

<sup>A</sup>Chairman of Steering Committee.

## Fellows of the Association for the Advancement of Animal Breeding and Genetics

‘Persons who have rendered eminent service to animal breeding in Australia and/or New Zealand or elsewhere in the world, may be elected to Fellowship of the Association.’

### Elected February 1990

R. B. M. Dun  
F. H. W. Morley  
A. L. Rae  
H. N. Turner

### Elected September 1992

K. Hammond

### Elected July 1995

C. H. S. Dolling  
J. R. Hawker  
J. Litchfield

### Elected February 1997

J. S. F. Barker  
R. E. Freer

### Elected June 1999

J. Gough  
J. W. James

### Elected July 2001

J. N. Clarke  
A. R. Gilmour  
L. R. Piper

### Elected September 2005

B. M. Bindon  
M. E. Goddard  
H.-U. Graser  
F. W. Nicholas

### Elected September 2007

K. D. Atkins  
R. G. Banks  
G. H. Davis

### Elected September 2009

N. M. Fogarty  
A. R. Fyfe  
J. C. McEwan  
R. Mortimer  
R. W. Ponzoni

### Elected September 2011

B. P. Kinghorn  
A. McDonald

### Elected October 2013

H. M. Burrow  
P. F. Fennessy  
G. Nicol  
P. Parnell

### Elected October 2015

P. F. Arthur  
D. Johnson  
K. Meyer  
B. Tier  
R. Woolaston

### Elected October 2019

S. A. Barwick  
H. T. Blair  
S. W. P. Cloete  
I. W. Purvis

### Elected November 2021

F. D. Brien  
D. Garrick  
J. Greeff  
B. Hayes  
J. E. Pryce  
J. H. J. van der Werf

### Elected July 2023

K. G. Dodds  
W. S. Pitchford  
H. W. Raadsma  
C. W. (Bill) Sandilands  
A. A. Swan

## **Honorary Members of the Association for the Advancement of Animal Breeding and Genetics**

'Members who have rendered eminent service to the Association may be elected to Honorary Membership.'

### **Elected September 2009**

W. A. Pattie

J. R. W. Walkley

## Fellows Elected 2023



### Ken G. Dodds

Dr Ken Dodds is a statistician located at Invermay Research Centre and is part of AgResearch's Statistics team. Ken has made a massive contribution to the New Zealand's genomic research over the course of his more than 35-year career working primarily in partnership with the Animal Genomics team at Invermay.

Ken was brought up on his parent's dairy farm near Mataura where they farmed pedigree Friesians. Ken did his undergraduate study at Otago University and then completed his PhD with Bruce Wier in statistical genetics at North Carolina State University before returning to New Zealand to work at the Ministry of Agriculture and Fisheries which subsequently became AgResearch.

Ken has guided numerous summer and PhD students, many of whom were formally supervised by others, in the delicate arts of appropriate statistical and genetic analyses for their projects. He has also been behind the statistical rigor of the Invermay group's many publications. His current tally of more than 12 000 citations of published papers where he is an author or co-author clearly demonstrates a significant impact on his field. Ken has contributed to research and subsequent industry implementation of many novel traits including carcass composition, meat quality, disease resistance and methane emissions, as well as the industry implementation of animal model and then genomic selection in New Zealand sheep, salmon, deer and goats. He is still actively working on bringing improvements to the NZ sheep and deer system some 25 years after its creation.

He has also played a similar role in the GenomNZ genotyping service over nearly 30 years. Several aspects of his work have made major contributions to statistical techniques which have had significant impacts both scientifically and industry. Although often overlooked, linkage mapping is still a difficult and developing field with

considerable issues relating to the travelling salesman problem of analysis complexity and the effect of genotyping errors. Ken has been instrumental in many papers in adapting and utilising linkage mapping techniques to solve real world problems, whether it was producing the first linkage map in the world for sheep, which was then used to identify the location of some key major genes and in the longer term contributed to the sheep and cattle genome assemblies. However, more recently with Timothy Bilton they solved the problem of using uncertain genotypes to create linkage maps. Then in another paper they also addressed the problem of estimating linkage disequilibrium with error prone genotypes.

Ken has also provided the primary statistical expertise in a series of papers mapping gene variants that have a major effect on sheep production including: Inverdale, Booroola, Woodlands, myostatin, parasite resistance, microphthalmia, horns and yellow fat. Genotyping for these variants is still routinely undertaken commercially today. The discovery of the causal mutations for Inverdale and Booroola was a world first in sheep for production traits. He has also made a major contribution in pedigree assignment and estimation of breed proportions from marker data and the software he has written underlies New Zealand's pedigree and breed assignment in commercial breeding programs in sheep, goats, salmon and deer.

In two areas this work has been rather unique. The first was the development and industry implementation of the fractional-parentage system which uses DNA marker information to calculate the pedigree of animals in breeding program. The fractional-parentage DNA pedigree system that Ken developed made the use of DNA parentage cost-effective in the New Zealand sheep industry by using relatively low numbers of DNA markers while maintaining the high rates of genetic progress. In more recent years he has developed and

maintains the KGD software suite available on Github. This population genetics software allows pedigree assignment, breed proportion estimation, and creation of genomic relationship matrices for subsequent use in many applications including genomic selection. At its core it transparently handles low depth genomic sequencing data which produces uncertain genotypes. This development has led to at least a ten-fold reduction of the cost of developing and deploying genomic selection in a new species. The method has been widely used

in more than 100 species to date including in conservation and production genetics in plants, mammals, birds, fish, decapods and shellfish.

Over his career Ken has presented or been co-author on 50 papers at AAABG, the first in 1991. He has also served on the AAABG committee. For his outstanding contributions to the science of genetics and animal improvement, the Association for the Advancement of Animal Breeding and Genetics is pleased to elect Ken Dodds as a Fellow of the Association.



### Wayne S. Pitchford

Professor Wayne Pitchford is the Director of the Davies Livestock Research Centre at the University of Adelaide. Wayne has had a significant impact on genetic improvement in both the sheep and cattle industries in Australia from his applied research and development across the supply chain for both species.

Wayne was born in 1966 in South Australia in the Adelaide suburb of Blackwood and grew up there and in nearby Coromandel Valley. His father John was the grandson of market gardeners and although he was an accountant he dreamt of being a farmer and this no doubt influenced Wayne's career path and farming interests. During Wayne's childhood there were many visits to the dairy farm of a family friend at Mannum as well as trips to the Flinders Ranges, with much time spent on Motpena station.

As an undergraduate at the University of Adelaide, Wayne studied Agricultural Science and in 1987 completed Honours in the Biometry Department, a rare and unusual choice which none of his fellow ag students could understand. His supervisor was the JS Davies Research Fellow, Scott Newman and his topic was the genetic analysis of crossbreeding in sheep. Wayne was awarded first class Honours and secured a position as technical officer at CSIRO, Griffith, working on irrigation research. However, Wayne chose to follow his future wife, Judith to Sydney and undertook a PhD at UNSW (Dept Wool & Science) under the supervision of John James and co-supervisors Ian Franklin and Oliver Mayo, studying the effects of genotype and environment on various traits in crossbreed sheep and cattle.

Wayne is currently Professor of Animal Breeding and Genetics and has lectured at the Waite and Roseworthy campuses since 1992. He has been a program leader in the CRC for Beef Genetic Technologies and the recent Advanced Livestock Measurement Technologies project, a

director for the CRC for an Internationally Competitive Pork Industry and continues to lead multiple sheep and cattle projects. He and his wife Judith have a farm at Keith run in partnership with their eldest son, James. Wayne has been actively engaged in industry development within South Australia since 2003 including both the sheep and cattle industry Blueprint working groups and their executive teams since 2015.

He has supervised 40 PhD and 57 honours students and works closely with the beef and sheep industries in Australia and New Zealand. Wayne's research and development has focused on maternal productivity, feed efficiency, carcass and meat quality as well as genomic analysis of commercial beef, sheep and goat breeding programs. More recently, he has been working closely with abattoirs to help them extract more value from carcasses by using objective measurement of quality. The logic is that as abattoirs extract more value from carcasses, demand for better carcasses will grow, thus leading to financial signals to farmers which will inevitably lead to adoption of improved genetics and production systems.

Wayne has had a long association with AAABG. He has not missed a conference since attending his first in 1988 before starting his PhD. He was Editor for the 1995 conference, President for the 2009 conference and Vice-President for the 2021 conference. He has also contributed papers to almost all AAABG conference proceedings since 1990 and more generally produced 270 publications with a h-index of 32. Wayne has also been a Treasurer (2002) and Vice-President of the Australian Society of Animal Production (now AAAS, 2016).

For his outstanding contributions to the science of genetics and animal improvement, the Association for the Advancement of Animal Breeding and Genetics is pleased to elect Wayne Pitchford as a Fellow of the Association.



### **Herman W. Raadsma**

Emeritus Professor Herman Raadsma has a long history of collaborative research that produced many significant advances in the quantitative and molecular genetics of sheep diseases, reproductive biology, livestock and aquatic genomics.

Herman arrived in Australia from Holland in his late teens and obtained a diploma from Hawkesbury Agricultural College, followed by a DipScAgr and MScAgr from the University of New England. In 1981 he commenced a research position at the NSW Department of Agriculture's Trangie Agricultural Research Station where his research showed that selection for resistance to blowfly strike on the body (as distinct from the breech) in Merinos was feasible, using indicator traits such as the extent of fleece rot. Herman and his colleagues made good use of the relatively new concept of underlying polygenic/multifactorial liability for diseases traditionally categorised on a binary (affected/normal) scale. This research resulted in a series of six pioneering papers entitled 'Fleece rot and body strike in Merinos', and very clear guidelines as to how the practical application of quantitative genetics can achieve substantial benefits for the Merino industry.

He moved to the University of Sydney in July 1988 as a Research Fellow and commenced a PhD under Professors John Egerton and Frank Nicholas, into the inheritance of host resistance to footrot in sheep. Characteristically, from the very start Herman was able to generate sufficient external funding to not only support his research but to also pay his own salary, which was far from the norm in those days. Another pioneering series of papers entitled 'Disease resistance in Merino sheep' resulted with Herman and his colleagues showing that breeding for resistance to footrot was very feasible. This basic research laid the foundation for the introduction in 2013 of EBVs for footrot by Sheep Genetics in a collaboration involving NZ Merino, AGBU, University of Sydney and NeXtgen Agri.

Herman was involved in the early days of molecular genetics and quickly realised the potential of mapped DNA markers to identify chromosomal regions (QTL) contributing to genetic variation in economically important traits. He commenced genome scans in segregating families resulting from crossing Merinos with a breed such as Awassi, at the other end of the trait spectrum (to the horror of the key research-funding bodies!). Combining this powerful resource with extensive (and very challenging) phenotyping led to the identification of many QTL for health, milk, fleece, and meat traits in Merino sheep. This work led to the identification of likely causal variants for inherited diseases in sheep and cattle and the introduction of DNA testing to industry. This program of research was duplicated in Indonesia with a 10 year collaboration between Monash University, and Indonesian science institutes of Lipi, Balitvet and Balitnak, to map QTL for resistance to liver fluke, internal parasites, immune function, growth, carcass, reproduction, and body morphology using unique crosses between Merino and Indonesian Thin Tail (ITT) sheep.

Herman established the Centre of Advanced Technologies in Animal Genetics and Reproduction (ReproGen) within the University of Sydney in 1999. Throughout the next 15 years, ReproGen encouraged and facilitated enhanced collaboration between geneticists and reproductive biologists in the practical application of research discoveries. From 2001 to 2010, as Program Leader for Gene Discovery in the CRC for Innovative Dairy Products, Herman led innovative and productive research on dairy genomics, including characterisation and utilisation of linkage disequilibrium in dairy cattle populations, and pioneering work on genomic selection using high density Single Nucleotide Polymorphic (SNP) markers.

Through his involvement as a member of the Executive and Professorial Research Fellow of the ARC Research Hub for Advanced Prawn Breeding at James Cook University and

multiple ARC linkage projects, Herman has contributed to the use of “omics” (including the development and use of genomic EBVs) in the characterisation and improvement of diverse aquatic species including shrimp and pearl oysters. Herman was the conduit in transferring fundamental terrestrial animal breeding knowledge into many of these emerging aquaculture breeding programs. His contributions have had an immediate impact in accelerating these programs.

Despite formally stepping down from his fulltime chair in Animal Genomics and Biotechnology at the University of Sydney in 2014, Herman continued in a wide range of genomic projects including wildlife projects in dingo and koala genetic diversity, with the same aim of exploiting genomic technologies for the betterment of animal agriculture and

conservation, as well as developing platforms for advanced phenotyping using artificial intelligence (AI). During his long career, Herman has mentored many PhD students and postdocs who have gone on to make major contributions to animal agriculture and conservation around the world. Within his close circle of colleagues, he is often affectionately referred to as the ‘grandfather’ of animal breeding, given the long list of current academics who were once mentored by Herman or his students themselves.

For his outstanding contributions to the genetic improvement of Merino sheep and the development of molecular genetics in the Australian sheep, cattle and dairy industries, the Association for the Advancement of Animal Breeding and Genetics is pleased to elect Herman Raadsma as a Fellow of the Association.



### C. W. (Bill) Sandilands

Bill was born in 1940 and completed school at Wesley College in Perth. His interest in genetics was kindled by his biology teacher, Mildred Manning. Bill said that although she seemed ancient to them, her thorough knowledge and love of biology shone through to them. With the laws of Mendel, and as the son of a sheep farmer, he could understand why some sheep are black, white, and or horned or polled.

The importance of quantitative genetics became clear to him when he attended a ram sale by Cranmore Park in the mid-fifties. Although the catalogue made dull reading, a page in the beginning explaining the value of progeny testing as being applied by Cranmore Park, made him realise the power of progeny testing. Needless to say, that made him want to understand quantitative genetics better, and he obtained the books 'Animal Breeding' by Dr Hagedoorn and 'Animal Breeding Plans' by Dr Lush which were Stuart Barker had referred to in his address at the first AAABG conference.

He joined his father in the late fifties on the family farm. His father was very supportive of Bill's interest in sheep breeding and assisted him in purchasing 83 Merino ewes and registering Billandri as a stud. Bill started to record fleece weights in his stud and from then onwards measurement of performance was part of their practice. In addition, Bill also applied his genetic knowledge in his commercial herd of Poll Shorthorn cattle. He used the Beef Recording Scheme in Western Australia to identify the best and worst cows in his herd. Here he learned that the cows that produced the best calves were not necessarily the prettiest, and the cows that produced the poorest calves looked magnificent in the sale yards!

Bill keenly followed the sheep breeding experiments of Helen Newton Turner and Bob Dunne in the eastern states. He was one of the first breeders in WA to use a selection index that included fleece weight, body weight and fibre

diameter to identify the best performing sheep in his flock. Subsequently he adopted the Woolplan selection index when it became available. He was a strong supporter of the first Sire Referencing Scheme conducted by the WA Department of Agriculture which allowed him to regularly benchmark his rams against rams from other flocks. He was one of the original members of the Federation of Performance Sheep Breeders of WA (President from 1991–2020) which has conducted the Yardstick Sire Evaluation site. He has progeny tested his rams every year in this scheme since its inception. He also provided sires for genetic links across years and flocks. He strongly adopted BLUP and as he has diligently collected full pedigrees on his lambs, he was in a very good position to take advantage of his excellent set of records, to identify the best sires in his flock and across flocks. This resulted in him to become one of the leading studs in Australia. Rams from his flock have been used widely across Australia, and which has benefited the whole Merino industry.

Bill is a committee member of the Stud Merino Breeders Association, an advisory committee member of the farm of Mount Barker High School, member and President of the Performance Sheep Breeders of WA, member of Merino Benchmark, member of Committee of Merino Lifetime Production Trial, inaugural and current committee member of the Committee of Australian Sire Evaluation Association (AMSEA), member of Steering Committee for the Australian Sheep Genetics and Merino Select and a member of the Committee of Merino Lifetime productivity (MLP) project.

Bill made significant contributions to research by hosting various research projects including Lifetime Wool (Ewe by Food on Offer), the impact of growth and muscling in Merino ewes, weaner feeding for fertility and the effect of wrinkle on reproduction traits by various institutions on his property.

Bill was a founding member of AAABG and contributed papers to the Association. He was also President of the Association in 1999 and was awarded the Helen Newton medal in that year. For his outstanding contributions to the

science of genetics and genetic improvement and its practical implementation, the Association for the Advancement of Animal Breeding and Genetics is pleased to elect Bill Sandilands as a Fellow of the Association.



### **Andrew A. Swan**

Dr Andrew Swan is the Chief Scientist at the Animal Genetics and Breeding Unit (AGBU), a joint venture between the NSW Department of Primary Industries and the University of New England and has been involved in highly collaborative sheep breeding research for more than 30 years with researchers, ram breeders and genetics service providers.

Andrew grew up in the Riverina region of New South Wales near Wagga Wagga, before attending the University of New England and graduating B. Rur. Sci. with first class honours in 1987. His honours research project was on crossbreeding Hereford and Simmental cattle, and with that background he joined the Animal Genetics and Breeding Unit as a PhD student studying multibreed genetic evaluation methods under the supervision of Hans Graser and Brian Kinghorn.

Following his PhD studies, he moved to the CSIRO Animal Production laboratory at Chiswick near Armidale and began a long career in sheep breeding. At the time the industry was dealing with the crash of the reserve price scheme and an over-supply of stockpiled wool, so the focus of breeding research turned to improving wool quality using new objective measurement technology. Andrew worked with the CSIRO Fine Wool Project team to understand the genetics of fine and superfine wool sheep, leading to the Towards 13-micron industry breeding consortium.

At the same time Andrew was participating in the development of the breeder-led system of sire evaluation trials run by the Australian Merino Sire Evaluation Association (AMSEA). Working with the Advanced Breeding Services

group of NSW Agriculture (now NSW DPI), he contributed to the across-flock evaluations published in Merino Superior Sires from the early 1990s. As a result of this involvement Andrew joined the Sheep Genetics Technical Committee in 2004 which developed the first industry-wide Merino genetic evaluation launched as MERINOSELECT in 2005. Following this landmark industry achievement, Andrew joined AGBU in 2006 to continue working on the MERINOSELECT and LAMBPLAN evaluation systems delivered through Meat and Livestock Australia's Sheep Genetics service.

In subsequent years Andrew has contributed to the introduction of breeding values for new traits, including carcase and eating quality traits, components of reproduction, and breech fly-strike indicators, and selection indexes focused on breeder needs and strategic industry targets. Andrew also participated in the development of genomic resources and technologies in the Sheep CRC, assisting in the transition of MERINOSELECT and LAMBPLAN to genomic evaluations.

He first attended AAABG at the 1988 conference in Armidale, nervously presenting two papers on his PhD research, and has since attended almost all conferences. As of the 2023 conference, he had contributed to just over 100 AAABG papers.

For his outstanding contributions to the development of Merino genetic evaluation and the transition to genomic evaluation in the Australian sheep industry, the Association for the Advancement of Animal Breeding and Genetics is pleased to elect Andrew Swan as a Fellow of the Association.

## The Helen Newton Turner Medal



### Helen Newton Turner AO OBE

The Helen Newton Turner Medal perpetuates the memory of an outstanding sheep geneticist, and a fine Australian. The award was established in 1993 following an anonymous donation to the Animal Genetics and Breeding Unit (AGBU). A joint venture between the NSW Department of Primary Industries and the University of New England.

The Medal is awarded to provide encouragement and inspiration to those engaged in animal genetics. It is named in honour of [Dr Helen Newton Turner](#) whose career with CSIRO was dedicated to research into the genetic improvement of sheep for wool production. Dr Turner's animal breeding research has had a significant impact on animal breeding research and application in Australia and internationally through her participation in overseas research. She was awarded a fellowship of AAABG in 1990 for her services to animal breeding.

The Helen Newton Turner Medallist is chosen by the [Trustees](#) of the Helen Newton Turner Trust from the ranks of those persons who have made an outstanding contribution to genetic improvement of Australian livestock. The [Helen Newton Turner Medal](#) was first awarded in 1994 to Associate Professor John James and a list of all recipients to date is given below.

The recipient of the Medal is invited to deliver an Oration on a topical subject of their choice.

### Helen Newton Turner Medallists

1994	J. W. James	2003	F. W. Nicholas	2015	A. R. Gilmour
1995	L. R. Piper	2005	K. Hammond	2017	A. Collins
1997	J. Litchfield	2007	L. Corrigan	2019	K. D. Atkins
1998	J. S. F. Barker	2009	R. Hawker	2021	J. H. J. van der Werf
1999	C. W. (Bill) Sandilands	2011	R. Banks		
2001	G. A. Carnaby	2013	M. Goddard		

The Oration of the 2021 Medal recipient, Professor Julius van der Werf, is reproduced in this AAABG special issue of *Animal Production Science*.

### The Helen Newton Turner Bright Futures Award

In 2021, the Helen Newton Turner Trust established a new award, the Helen Newton Turner Bright Futures Award to recognise the achievements of an up-and-coming individual who is showing evidence of establishing a reputation for excellence in the field of animal genetics within Australia.

2021	S. A. Clark
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