

1. The Save Sight Institute Vision and Mission



The Save Sight Institute is located on the historic site of Sydney's first hospital and shares this home with the Sydney Eye Hospital

Sight for Living, Sight for Life!

Established on 6 May 1985, the Save Sight Institute is a not-for-profit organisation working with government and community to save sight. Its work and its vision provide a unique fusion of scientific endeavour, clinical excellence and community spirit!



Lion's Sight for Life Unit Dedicated to the prevention of blindness

The Lions Sight for Life Unit is active in the prevention of blindness and raising of funds for the Save Sight Institute.

Our Vision:

Sight for Life
for the whole community.

The Mission:

New Knowledge Creation
to save sight.

Research Focus:

**Eye Disease &
Vision Science**

ensuring that the unsolved blindness of today becomes curable and preventable tomorrow.

Communication Technologies

exploiting digital media to train the next generation of eye doctors; increasing community awareness and extending eye health services to remote and rural communities.

**Community Service &
Eye Care**

developing eye health services, diagnostic tools and screening programs for prevention of eye disease.

2. Table of Contents

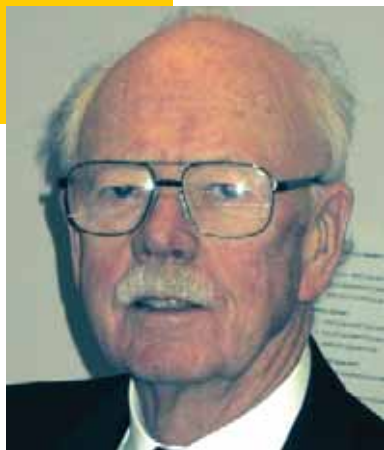


Dr Michele Madigan

New Knowledge
Creation to
Save Sight

1	Save Sight Institute — Vision and Mission	2
2	Table of Contents	3
3	President's Report	4
4	Director's Report	6
5	Save Sight Institute Staff	9
6	Spectrum of Eye Disease — SSI Research & Response	12
7	Teaching Activities	17
8	Community Activities in Australia	22
9	Community Activities in World Ophthalmic Health	24
10	Major event — International Congress of Eye Research at Darling Harbour	26
11	Clinical & Laboratory Research — A Powerful Interface	27
12	Funded Research Projects	29
13	Publications in 2004	31
14	Abridged Financial Statements	33
15	Major Donations	35
16	Share the Vision — Invest in the future	37

3. President's Report



Ken Coles

The Save Sight
Institute...
an internationally
recognised eye and
vision research
Institute

At the Annual General Meeting held on 23rd August 2004, I was honoured to be re-elected by the Council as your President for the year ahead. 2004 was another year of progress for the Save Sight Institute detailed more fully in the reports of the Director the Institute since its inception in 1985, Professor Frank Billson AO and in the scientific report of Professor John McAvoy. (The full scientific report is available upon request.) The Annual Report also details the spectrum of eye disease and the research work of the Save Sight Institute to prevent and delay the onset of blindness.

Professor Billson has received many honours and awards over the past twenty years and last year was no exception. I am sure we would all like to congratulate Professor Billson on the receipt of two prestigious awards. In November 2003 he received the International Prevention Award for 2003 in recognition of his dedication to the prevention of blindness and restoration of sight by the American Academy of Ophthalmology. In June 2004 he was invited to deliver the Claud Worth Lecture at the British Children's Eye Group Meeting held in Swansea, Wales and hosted by the Singleton Hospital. At the meeting he was presented with the Claud Worth Lifetime Distinction Award of the Institute of Child Health, University of London for his pioneering work in prevention and management of blindness of prematurity.

You will see from the annual accounts that the finances of the Institute continued to improve during 2004 with both income and reserves increasing. Most of this income is from research grants for specific scientific research projects complemented by the State Government Infrastructure grant. The infrastructure grant, amounting to \$199,000 per annum for three years funds, the running costs of the facilities and staff supporting the research scientists. It is a fixed annual amount and is not indexed to the actual grants received. Our increasing success in gaining research grants reduces the relative proportion of the infrastructure funding available to properly support the scientists.

Our income comes from donations, it is very important in helping to make up this shortfall to provide for some discretionary spending on things we could not otherwise do. We also acknowledge with our thanks other valuable supporters, including the Claffy Trust, the Sydney Eye Hospital Foundation and the Medical Foundation of the University of Sydney.

We especially thank all those who donated \$250 to become Members of the Save Sight Institute for a year, those who donated \$500 to become Silver Members and those who donated \$1,000 to become Gold Members. We thank all these Members for their vital contribution to the success of the Institute. We have listed their names in this Annual Report.

New equipment installed during the year enhanced our capabilities both in the research laboratories, for the doctors working in the clinic and for teaching. We are indebted to the University for the fibre-optic cable connection to the University network. The video conferencing unit installed in our boardroom provides the opportunity to connect with other research institutions anywhere in the world. It has already proved valuable in strengthening communication with the Dubbo Rural Clinical School and in assisting the delivery via the internet of the inaugural year of our Postgraduate Diploma/Masters of Ophthalmic Science program in conjunction with Otago University in New Zealand.

3. President's Report *(continued)*

The progress made this year continues to add to the stature of the Save Sight Institute as an internationally recognised eye and vision research Institute. You can gain some idea of the scientific progress being made from reading the details of the papers published during the year by our scientists. May I thank the Director of the Institute, Professor Frank Billson, the Director of Experimental Ophthalmology, Professor John McAvoy, members of Council, the research scientists, the clinicians and the staff for their dedication and support and for sharing our vision of Sight for Life.

In closing may I thank the members of the Council for their wise counsel and support over the past year. The Institute is indebted to the support provided by NSW & ACT Lions to us and to our sister organisation, the Lions NSW Eye Bank. Our Council is enriched with three members of the Lions elected to Council each year at their annual conference. Mr Greg Dunn, Ms Michele Bentley and Mr Syd Hyett were elected by Lions to Council and Council re-elected Mr Greg Dunn as Deputy President. We thank Mr John Layhe for his year of service and welcome back Mr Syd Hyett. Mrs Janette Parkinson served on our fund raising sub-committee and I thank her for her contribution.

Ken Coles AM
President

4. Director's Report



Professor Frank Billson

National and international recognition for eye research

Introduction

In 2004 the Save Sight Institute (SSI) achieved fresh milestones contributing to an increase in the SSI's international standing. There were new initiatives in research, postgraduate education and community service in Australia and overseas. I pay tribute to all those who have made this possible: the Board of the SSI under the leadership of our President Ken Coles, our donors, our academic staff and our administrative staff.

Research

Our research at all levels has increased. Our research team includes leaders in laboratory research, leaders in clinical research and leaders in clinical trials; our young research team includes 19 postgraduate research scientists working in the major areas of blinding disease. All are critical to the future of the Institute contributing new knowledge in their research publications and in their research for their 15 PhDs and four Masters by thesis.

In 2004 national and international recognition for eye research in the SSI was boosted at the International Congress of Eye Research (ICER) held at the Sydney Convention & Exhibition Centre, Darling Harbour. This was the first time ICER had been held in Australia. We congratulate Professor John McAvoy who chaired the local Organising Committee. The SSI was a major sponsor of this meeting. The meeting attracted some 730 participants. Scientists and clinical academics contributed papers at the meeting. The SSI hosted a party for distinguished scientists and academics on the final night. Suffice to say, the meeting provided further opportunity for the SSI to strengthen its ties with the international visual scientists and the scientific community through its role in hosting this meeting.

2004 was also an important year for overseas fellows in research. Associate Professor Jörgen Larsson from Sweden worked with Associate Professor Mark Gillies in clinical trials in Age-Related Macular Degeneration (AMD) and also with intra vitreal triamcinolone, a landmark research development in the SSI dating from its basic research with Dr Phillip Penfold, and Associate Professor Jan Provis in the 1980's. At that time SSI was the first research group to recognise the presence of the immune system in the human retina. The role of the immune system in the developing retinal blood supply and its up regulation in AMD has been quoted as ushering in a new era of medical management for human retinal disease.

The year saw further development of a close partnership in research with Professor Roger Truscott. He has been associated with the SSI since the 1980's and over the past three years has worked increasingly closely with the Institute sharing in grants and sharing students. There is an urgent demand for increased space for research and to accommodate the expanded research program. The need for this space will become most urgent and certainly will need to be addressed in early 2005 as collaboration with the University of New South Wales and its academic staff increases.

2004 was an important year for new initiatives in developing clinical and molecular genetics in association with the Children's Medical Research Institute. Dr John Grigg back with us from his two years' Fellowship with the University of Manchester and the Manchester Eye Hospital has continued his interests in glaucoma, electrophysiology and paediatric ophthalmology including clinical genetics. His wife Dr Robyn Jamieson who is Senior Lecturer at the Children's Medical Research Institute at Westmead and the Children's Hospital at Westmead also holds an Honorary Senior Lectureship at the SSI and is associated with the SSI's special ocular genetics clinic which will be part of the interface between the institutions in laboratory and clinical research.

4. Director's Report *(continued)*

Dr Max Conway is currently the Neil Hamilton Fairley Research Fellow and also returned at the end of 2004, following two years of distinguished clinical and laboratory research experience in ocular malignancy in Europe and for the last year in the University of California, San Francisco, working with Dr Joan O'Brien on retinoblastoma. Max will work with our tumour group and with his former colleague Dr Michele Madigan and also through the Institute with Professor Barry Allen and Professor Frank Billson.

Teaching

2004 saw the SSI Educational Conference jointly mounted with Sydney Eye Hospital Eye Registrars. The theme for 2004 was neuro-ophthalmology and our international guests included Professor Peter Savino from the Wills Eye Hospital, Philadelphia and Professor Creig Hoyt who heads the University of California Department of Ophthalmology, San Francisco and previously trained with us. These meetings attract 90-95% of those in vocational training for ophthalmology in Australia and New Zealand. The international guests were impressed with the contribution to the program of the young people in the Sydney Eye Hospital vocational training program shared by the SSI.

2004 saw the introduction of the first students for the Graduate Diploma and Masters in Medicine in Ophthalmic Basic Science. This course is an international initiative with the Dunedin School of Medicine, Department of Ophthalmology in the University of Otago, New Zealand working with the SSI encouraged by the Dean of the Faculty of Medicine of the University of Sydney, Professor Andrew Coats.

The SSI has provided clinical fellowship training for 36 Sri Lankan ophthalmologists over 20 years. The Sri Lankan Fellow in 2004 was Dr Halpitage Hema Padmini. From New Delhi, India, Dr Sapna Dave joined the Institute to complete a fellowship in paediatric ophthalmology. The SSI also hosted Mr Reaz Husain from Bangladesh who has had an integrated course in management with the Institute, Sydney Hospital and Sydney Eye Hospital and with the Kogarah TAFE.

2004 saw the SSI's involvement in the training program in the Centre of Ocular Microsurgery. Training the next generation in eye surgery in the Sydney Eye Hospital there is a seamless interface between the University and students at the Sydney Eye Hospital and increasingly with the Prince of Wales Hospital and the University of New South Wales Registrar Training Program. There is involvement and enthusiasm of the young people in the program, the largest in Australia and becoming even larger with its increasing interface with the University of New South Wales Program at Prince of Wales Hospital.

International Collaboration

2004 celebrated the appointment of Dr Ravi Thomas to the position of Director of the LV Prasad Eye Institute in India. Dr Thomas was previously trained at the SSI and already the SSI has strong collaborations with the LV Prasad Eye Institute, the most prestigious not-for-profit Eye Research Institute in India.

In June Professor Billson gave the Claud Worth Oration in England and was awarded the Claud Worth International Medal for lifetime achievement in Paediatric Ophthalmology by the University of London Institute of Child Health.

In July Professor Billson was the international guest lecturer at the conference organised in Khota Bharu through the Universiti Sains Medical School, a School the University of Sydney has played a critical role in developing in Malaysia. He lectured on retinoblastoma and the current state of research. He also organised a three hour workshop on strabismus. Later the Director was the principal lecturer at the Annual Scientific Conference of the College of Ophthalmologists in Sri Lanka.

The SSI has cemented links with academic eye institutions in China, both within the Medical School in Tenjin and also in Chongqin, where the SSI has been instrumental in assisting the development of eye banking. The head of the University Department, Professor Yin, was guest lecturer at the SSI in June and arrangements were made to provide research experience for Dr Tao Yu in paediatric ophthalmology in 2005 in the Institute.

Community Service International

This international activity and community service continues with the participation of the staff with Lions NSW Eye Bank and Foresight Australia, both organisations with which the SSI work closely, and through them contribute to East Timor, the Solomon Islands, programs in Cambodia, Myanmar, Bangladesh, Sri Lanka and China.

4. Director's Report *(continued)*

In Australia community service with the SSI continues to be strong relating to Lions Clubs of NSW and St John Ambulance Australia. This involvement in Australian non-government organisations in programs concerned with detection and cure of blindness is important and 2004 saw the development of the Lions Prevention of Blindness Unit initiative in the SSI which will be further actioned in 2005.

The Director is on the National Board of St John Ambulance Australia with responsibility to assist and support the Jerusalem Eye Hospital and to encourage the development of eye Outreach Programs in Australia. The SSI and the University of Sydney have shared programs in the Katherine area of the Northern Territory and also in New South Wales through the program in the Macquarie Health Area through the Thubbo Aboriginal Medical Co-operative which is now linked to the Dubbo Rural Clinical School.

The St John Ambulance Australia branch in New South Wales has provided support to the Thubbo Aboriginal Medical Co-operative in Dubbo. In August 2004, The Hon Tony Abbott MP, Federal Minister of Health, opened the Dubbo Rural Clinical School of the University of Sydney and the Eye Service in the Thubbo Aboriginal Medical Co-operative. The Centre is now linked directly through a radio dish with the School and an agreement has been signed between the University and the Thubbo Aboriginal Medical Co-operative sharing in the project and providing service to Aboriginal people, but providing opportunity for medical students to understand primary care initiatives and how the health services should best interface with Aboriginal medical communities. Professor Rick McLean, Associate Dean of the School of Rural Health, Dubbo has given tremendous support.

Funding

The Institute's budget shows balanced expenditure against income. Funding is related to success in achieving peer-reviewed national and international competitive research grants. Our donors support these funds. Donations are critical to making our research possible, together with donations provided through the contributions of clinical staff associated with the Institute. The Institute's involvement in clinical trials and the development in translational research of sophisticated methods for defining diseases of vision have increasingly excited the interest not only of ophthalmologists but also of neurologists and neuro-ophthalmologists. These developments allow for early diagnosis of glaucoma and also have important consequences for monitoring optic neuritis associated with multiple sclerosis and ischemic optic neuritis secondary to vascular disease. Research is being pursued into further developing the technology to extend the use of this instrumentation in a mobile setting to be used in fieldwork.

Conclusion

2004 has been an extremely productive year and the enthusiasm of young people working in the SSI is infectious. Development of physician scientists is succeeding. Interface of the Institute with the broader Australian community is strong. The Lions NSW Eye Bank under the purview of SSI has provided corneas for 456 sight-saving surgeries throughout New South Wales. The staff has contributed to countries in the Asia Pacific region through the Institute, but also through SSI's overseas arm Foresight Australia, an international NGO dedicated to prevention and cure of blindness. All of this is underpinned by a strong research program committed to bringing new knowledge from research at the laboratory bench to clinical settings and the bedside and finally the community.

Working with the University community provides many synergies. Not least are the close relationships of the SSI with the Institutes within the Faculty of Medicine, particularly in the Central Clinical School, including the Brain and Mind Institute and the Medical Foundation of the University of Sydney. We acknowledge and appreciate the support given to the Institute through senior University administration and through the Senate of the University to whom we ultimately report through the Vice Chancellor, Professor Gavin Brown, who has encouraged us in the mission we seek - for "Sight for Life": with sight to enjoy life, sight for the duration of life.

Frank Billson AO

5. Save Sight Institute Staff

Patron

Her Excellency Professor Marie Bashir AC
Governor of New South Wales

Board of Directors

Appointed Members

Mr Ken Coles AM
President
Professor Frank Billson AO
Director
Mr Greg Dunn
Deputy President
Mrs Michele Bentley
Mr John Davies AM
Professor Ramzi Fayed
Mr George Harris
Mr Peter Ketley
Mr John Layhe
Professor John McAvoy
Mr Ben Meek
Mrs Caroline Wilkinson

Ex Officio Members

Justice Kim Santow OAM
Chancellor
Emeritus Professor Ann Sefton AO
Deputy Chancellor
Professor Gavin Brown FAA
Vice Chancellor
Professor Don Nutbeam
Pro Vice Chancellor – College of Health Sciences
Professor Andrew Coats
Dean Faculty of Medicine

Academic Staff

Professor Frank Billson AO, FRANZCO, FRACS
Professor John McAvoy BSc, PhD
Associate Professor Mark Gillies PhD, FRANZCO, FRACS
Dr Max Conway PhD, FRANZCO, FRACS (NHMRC Neil Hamilton Fairley Fellow)

Dr John Grigg PhD, FRANZCO, FRACS
Senior Lecturer
Dr Frank Lovicu BSc, PhD
Lecturer
Dr Kathy McClellan PhD, FRANZCO, FRACS
Senior Lecturer
Dr Michele Madigan BOptom, PhD
Research Fellow
Dr Con Petsoglou MMed (Clin Epid), FRANZCO, FRACS
Clinical Lecturer

Clinicians with Academic Appointments to University of Sydney, Discipline of Ophthalmology

Clinical Associate Professor Philip Clifton-Bligh
Dr Andrew Chang PhD, FRANZCO, FRACS
Clinical Senior Lecturer
Dr Rhaf Ghabrial FRANZCO, FRACS
Clinical Senior Lecturer
Dr Stuart Graham FRANZCO, FRACS
Clinical Lecturer
Dr Gagan Khannah FRANZCO, FRACS
Clinical Associate Lecturer
Dr Anthony Maloof FRANZCO, FRACS
Clinical Senior Lecturer
Dr Gerard Sutton FRANZCO, FRACS
Clinical Lecturer
Dr Nitin Verma FRANZCO, MM (Ophth), MD (Ophth)
Hon Senior Lecturer

Administrative & Clinical Staff

Mr Alaa Al-Edwan MA
Administration Assistant
Ms Haipha Ali BAppVisSc (Orthoptics)
Orthoptist
Mr Hassan Al Khatab BSc
Financial Controller
Dr Iain Dunlop FRANZCO, FRACS
Staff Ophthalmologist
Mrs Lisa Feldman RN, Dip Health Sci (Pathology Techniques)
Electrophysiology Technician
Mr Bill Hoddinott
Clinic Attendant
Mr Ryan Kirgan
IT Support
Ms Assya Klistorner
Electrophysiologist Technician
Ms Barbara MacDougall
Clinic Manager
Ms Priya Narayan BAppVisSc (Orthoptics)
Orthoptist
Mrs Gisela Payne
Personal Assistant to the Director
Ms Anna Sclavos BOptom
Optometrist
Mrs Ann Studerus
Clinical Secretary
Ms Linda Young BA
Projects Officer



Some of the SSI staff in front of South Block, Sydney Hospital Campus

5. Save Sight Institute Staff (continued)



Gisela Payne, Barbara MacDougall
and Linda Young

Finance Committee

Mr Ken Coles AM
Professor Frank Billson AO
Mr John Davies AM (Chairman)
Professor Ramzi Fayed
Professor John McAvoy
Mr Ben Meek

Foresight Australia

Patron

Major General Paul Cullen AC, CBE,
DSO, ED, FCA

Board Members

Professor Frank Billson AO FRANZCO,
FRACS
Chairman
Mr John Davies AM
Dr Maureen Gleeson BHA, MHA, PhD
Mr George Harris BA, LL.M.
Mrs Anne Leach BA
Dr Kathy McClellan PhD, FRANZCO,
FRACS
Dr Geoffrey Painter FRANZCO, FRACS
Mr Mohammad Sultan
(Foresight/Leila, PNG)
Dr Nitin Verma FRANZCO, MM
(Ophth), MD (Ophth)

Administration

Mr Hassan Al Khatab
Honorary Secretary
Mr John Davies AM
Honorary Treasurer
Mr Paul Pryce
Honorary Auditor
Ms Linda Young
Projects Officer

Medical Advisors

Professor Frank Billson AO, FRANZCO,
FRACS

Dr John Kearney FRANZCO, FRACS
Dr Max Conway PhD, FRANZCO,
FRACS
Dr Roger Dethlefs FRANZCO
Dr Kathy McClellan PhD, FRANZCO
Dr Neale Mulligan FRANZCO
Dr Geoffrey Painter FRANZCO, FRACS
Dr Gerard Sutton MS (Oph),
FRANZCO, FRACS
Dr Nitin Verma FRANZCO, MM
(Ophth), MD (Ophth)

Foresight Volunteers

(Recycled Glasses Program)

Mr Paul Davis
Miss Doris Flood
Miss Mary Kane
Mrs Anne Leach
Mr Don McDonald
Mr Livio Siviz
Mrs Elizabeth Thilo
Mr John Wilmott



Miss Doris Flood, a Foresight volunteer

Lions NSW Eye Bank Staff

Professor Frank Billson AO, FRANZCO,
FRACS
Director
Dr Con Petsoglou MMed (Clin Epid),
FRANZCO, FRACS
Deputy Director and Production
Manager

5. Save Sight Institute Staff (continued)

Dr Kathy McClellan PhD, FRANZCO, FRACS

Medical Advisor

Mr Raj Devasahayam BAppSc
Senior Scientist

Mr Pierre Georges MSc (Med)
Transplant Coordinator

Ms Helen McKeon BSc
Transplant Coordinator

Mr Robert McDonald BA Cog Sci
Transplant Coordinator

Mr Brendan O'Shea
Transplant Coordinator (till June 2004)

Ms Kellie-Anne Thomas
Transplant Coordinator

Dr Meidong Zhu MMed, PhD
Research Fellow

Honorary Professor based at Centre for Experimental Radiation Oncology, St. George Hospital

Ms Sharyn Ang BSc (Hons)
Research Assistant

Dr Max Conway PhD, FRANZCO, FRACS
(NHMRC Neil Hamilton Fairley Fellow)

Dr Elisa Cornish PhD
Research Academic

Dr Christine Gaston MBBS
Clinical Research Coordinator

Associate Professor Mark Gillies PhD, FRANZCO, FRACS

Dr John Grigg PhD, FRANZCO, FRACS

Dr Philip Penfold MPh, PhD
Hon Senior Research Fellow

Associate Professor Jan Provis BSc, PhD

Hon Associate Professor

Professor Jonathan Stone DSc, FAA
Ms Bryony Stracey

Lab Technical Assistant

Dr Richard Stump BSc, PhD

Laboratory Manager

Associate Professor Roger Truscott BSc, PhD

(also University of Wollongong)

Mrs Diana van Driel BSc (Hons)
Senior Research Assistant

Dr Li Wen MSc

Research Assistant

Mr Chris Willcock BSc

Research Assistant (based at Childrens' Hospital, Westmead)

Dr Martin Windsor PhD
Research (Academic)

Dr Li Yong

Honorary Senior Research Fellow

Dr Meidong Zhu MMed, PhD
Research (Academic)

Registrars and Visiting Fellows

Dr Paula Berdoukas

Professorial Senior and Honorary Associate

Dr Sapna Sharan Dave

Clinical Fellow

Dr Claire Hooper

Professorial Junior

Dr Nikhil Kumar

Professorial Junior

Associate Professor Jörgen Larsson

Visiting Scholar

Dr Charmaine Lim

Professorial Junior

Dr Tim Nolan

Professorial Junior

Dr Halpitage Hema Padmini

Clinical Fellow

Research

Professor Frank Billson AO, FRANZCO, FRACS, FACS

Director

Professor John McAvoy BSc, PhD

Director Experimental Laboratory Research

Professor Barry Allen



Dr John Grigg

Dr Robyn Jamieson MBBS (Hons I), FRACP, PhD

Hon Senior Lecturer (based at Childrens' Hospital, Westmead)

Dr Alexander Klistorner BMed, PhD
Research Fellow

Dr Maria Korsakova MBBS

Hon Associate and Electrophysiologist

Dr Frank Lovicu BSc, PhD

Dr Michele Madigan BOptom, PhD
Ms Maria Males RN, BN, BA, G. Dip

Acute Care Nurs

Clinical Research Officer

Dr Kathy McClellan PhD, FRANZCO, FRACS

Mr Alexander Osmakoff

Software Engineer



Dr Elisa Cornish and Dr Michele Madigan

6. Spectrum of Eye Disease SSI Research and Response



Professor Frank Billson

Blindness can occur at
any time of life
- in children it can
mean a lifetime
without sight

Blindness can occur at any time of life – but mostly affects those at the vulnerable ends of life’s spectrum – children and the elderly. In children it can mean a lifetime without sight and on this basis is the second most common cause of world blindness.

Eye Diseases affect:

Visual Development in Children.

Cataract, glaucoma, retinopathy of prematurity and strabismus pose secondary problems of visual loss due to interference with development.

Transparent structures of the eye.

Cornea scarring causing corneal blindness.

Lens causing cataract.

Reception of visual images in the eye.

Retina – macular disease due to degeneration, diabetic eye disease and retinitis pigmentosa.

Optic nerve damage from glaucoma, and tumours or degeneration of the visual pathway disrupt passage of visual information to the brain.

Childhood Blindness

Blindness in children is the second major cause of world blindness. What is unique about childhood blindness is that if the child does not experience normal visual function in each eye simultaneously during the early years of life, vision will be permanently impaired from a condition known as amblyopia. This demands that cataract and glaucoma in childhood be treated without delay even in the first weeks of life.

In Australia, childhood blindness is mainly due to developmental problems. In developing countries, it is largely due to nutritional and infectious causes.

SSI staff pioneered improvements in microsurgical techniques that have resulted in the prevention of blindness and restoration of sight in children. Intra-ocular lens implantation (IOL) following cataract surgery in children as young as one to two years of age is now routine. SSI studies in molecular and clinical genetics are also shedding significant light on congenital cataract and glaucoma.

The management of retinopathy of prematurity (ROP), congenital cataract and glaucoma has improved so much in recent years that good vision for life is now the rule rather than the exception, provided disease is recognised early. Collaborating with the intensive care nursery of the Newborn and Premature Babies Unit at Royal Prince Alfred Hospital, SSI’s joint research and care initiatives have resulted in a marked improvement in the vision of premature babies. In the last two years there have been no cases of blindness from retinopathy of prematurity in that hospital.

Through its international arm Foresight, the SSI plays a leading role in programs to prevent childhood blindness in the Asia-Pacific region. The SSI shares WHO Vision 2020, which includes prevention of avoidable blindness in children as a major objective.

Cataract

The lens sits behind the cornea and because of its curvature and refractive properties, focuses light onto the retina. When the lens becomes cloudy this is known as cataract.

6. Spectrum of Eye Disease

SSI Research and Response *(continued)*

Cataract is the major cause of blindness in the world. At present the only treatment available is surgery. In Australia 120,000 cataract operations are performed yearly at a cost of \$378 million. However, the fact that about 23 million people worldwide are blind from cataract reflects a lack of health services in many countries. Whilst organisations such as Foresight Australia work tirelessly to establish appropriate services and resources to alleviate the burden of cataract blindness, this will only serve to slow the rate of increase in cataract blindness. New drugs/molecular therapies are desperately needed to prevent or slow the progression of cataract and also to improve the outcome of current surgery. The Institute's research aims to reduce the burden of cataract blindness. Delaying the onset by 10 years would halve the amount of surgery required, with obvious savings to the community.

Recent integration of University of Wollongong cataract researchers into the SSI makes this Institute one of the strongest centres for innovative cataract research in the world. Collaborative efforts at SSI into understanding the molecular basis of cataract are now focused on two main fronts: (i) how growth factors induce aberrant cell behaviour characteristic of subcapsular cataracts; (ii) how a diffusion barrier limits key molecular exchanges in the lens that leads to changes characteristic of nuclear cataract. This consolidation of research efforts has opened up opportunities for new strategies for treating cataract and complications that result from modern cataract surgery.

Cornea and External Eye Disease

Corneal infection remains a significant cause of blindness worldwide. At the SSI, we aim to determine the distribution of herpes simplex and other viruses in human trigeminal ganglia and cornea using polymerase chain reaction to amplify viral DNA. Herpes simplex, when it recurs in the cornea frequently causes permanent scars and conventional corneal transplantation frequently fails when used in an attempt to restore sight in affected eyes. Herpes simplex can also complicate bacterial corneal ulcers, especially in older patients. Our clinical research into corneal abscesses has shown this in our latest survey of patients admitted to the Sydney Eye Hospital for management of corneal infection. Knowing the distribution of viral DNA in the major sensory nerve ganglia of humans will enable the immunological mechanisms that prevent viral corneal infection to be better understood.

Our clinical research enables us to monitor the antibiotic susceptibilities of the common bacteria isolated from patients with corneal infection. This work is important to provide guidelines to doctors who prescribe antibiotics and to indicate emerging bacterial resistance. Contact lens-related infection remains a leading cause of admission of patients under the age of 40 years to the Sydney Eye Hospital and in most instances can be traced to bacterial contamination of the contact lens case. Extended wear of contact lenses (i.e. overnight wear) results in deprivation of oxygen and breakdown of the corneal surface, which allows bacteria to multiply and causes corneal abscesses.

Research to develop techniques for extending the viability of corneas when stored for transplantation is in progress in the Lions New South Wales Eye Bank in the SSI. In conjunction with this work an investigation of the criteria for donor suitability is focusing on the use of organ culture to detect bacterial contamination. The outer eye environment is exquisitely adapted during life to exclude bacterial infection. Even in severely ill patients who have systemic infection it is most unusual to find concurrent eye infection. By storing corneal donor material for up to 4 weeks at 37°C we will be able to determine the incidence of likely infection and enhance the safety and efficacy of corneal transplantation.

Glaucoma

Glaucoma affects the sight of nearly a quarter of a million Australians and is the second most common cause of blindness in developed countries after macular degeneration. Glaucoma is an optic neuropathy that is a disease affecting the visual pathway between the eye and the brain. In the case of glaucoma, a disease of the optic nerve, the damage to the optic nerve results in loss of the area of vision to produce what is ultimately known as tunnel vision. Glaucoma may occur at any age. It poses particular problems in infancy and early childhood when the visual system is most vulnerable. Approximately 2% of the population over the age of 40 is affected and family history represents a six times greater risk.

6. Spectrum of Eye Disease SSI Research and Response *(continued)*

The SSI, in its desire to evaluate the health of the visual pathway, has sought to record the electrical signals initiated when a visual image excites the retina at the back of the eye resulting in tiny electrical signals generated in the brain when the patient views a complex multifocal stimulus on a computer screen. What the scientists discovered was that recording of the amplitude of the responses in glaucoma makes it possible to develop a map of the visual field that corresponded to the area of vision that patients themselves were able to see. Although the SSI invention of the AccuMap can be used as an objective perimeter this is only part of its capacity to provide information about the function of the optic nerve.

Known as ‘the sneak thief of sight’ glaucoma must be suspected on the appearance of the nerve of sight and the characteristic manner in which the field of vision (area of vision) is gradually lost. Early diagnosis and treatment is critical in prevention of field loss. Testing requires presenting the patient with visual targets (stimuli) and recording the response. The response in subjective tests requires the patient to indicate they see the target (subjective perimetry). The challenge for the Institute was to record an objective response (the tiny electrical signals generated in the brain when the patient views a complex multifocal stimulus on a computer screen - objective perimetry). Success for the SSI came in 2001 with the SSI invention of the objective perimeter, now known commercially as the AccuMap.

The story has a certain romance as it includes the value that newcomers to Australia can add in our search for new knowledge. In 2001 Dr Alexander Klistorner, a Russian ophthalmologist, came to Australia and pursued his love of research gaining his PhD in the Electrophysiology of Vision. His clinical background made him particularly interested in solving the problem of objective diagnosis of glaucoma when he joined the Institute. Dr Klistorner was later joined by Dr Stuart Graham and a large team of collaborating scientists that have made this invention possible.

ObjectiVision Pty Ltd was set up as a private company with the initial Board represented by the scientists who developed the **Stimulator**, the scientists who developed the recording technology together with a business plan, and initial funds and expertise coming from individual SSI Board members. The Intellectual Property surrounding the **Stimulator** represented the equity of the inventors for the new company. The Intellectual Property surrounding the Recorder was leased from the University, which was allocated 40% of the shares. The private company then sought venture capital from a public company and appointed Medcorp. The University shares ensured its place as one of the Directors on the Board. In 2002 the AccuMap V1.3 objective perimeter was launched as a new test for glaucoma where the objective map of the electrical responses in the brain replaces the field of the patient’s subjective responses. The AccuMap won two Australian design awards in 2002.

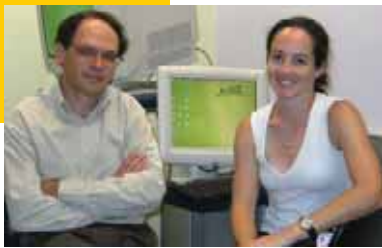
The AccuMap has been further developed with major advances in software using the OPERA V2.0 platform, and has high patient acceptance. The system received FDA (Federal Drug Administration) approval in late 2003, and later that year was launched in the USA at the American Academy of Ophthalmology. Heidelberg Engineering have been contracted to be US distributors.

Dr Alexander Klistorner and Dr Stuart Graham at the SSI are co-ordinators for a multicenter Early Glaucoma Detection trial of the AccuMap involving five US sites. The US clinical trials are underway and initial results have started to filter through. We do not yet have enough data to comment, but there has been an increased interest in the technology as a result. The results of this study are predicted to confirm the demonstrated effectiveness of the technology as compared to conventional methods of detecting glaucoma. Dr John Grigg and Professor Frank Billson are principle investigators of the visual pathway in children.

What has proved exciting since 2004 is the AccuMap’s future as a critical tool evaluating impairment of the visual pathway from diseases other than glaucoma such as tumour, inflammatory disorders and mini strokes in the optic nerve. It gives information about the strength and frequency of visual information passing in electrical signals down the visual path to be decoded at the back of the brain. The AccuMap’s importance goes beyond fields of vision in glaucoma to understanding the visual pathway itself telling us more about the function of the pathway than the disturbance of visual field. It also provides information about the visual pathway in children and in those who have difficulty with the conventional methods of visual field testing and assessment.

6. Spectrum of Eye Disease

SSI Research and Response (continued)



Dr Alexander Klistorner and Clare Fraser in front of the AccuMap

During 2004 further studies were conducted with the AccuMap in recording the amplitude of the electrical responses to map the visual field. These experiments with blue/yellow stimuli in detection of glaucoma conducted by Dr Alessandra Martins and Dr Alexander Klistorner have been most promising, showing more significant changes for patients with early glaucoma, than the black/white pattern. We have also been able to achieve an enhanced signal by using a slower presentation rate for the pattern reversals. These stimulus options will be incorporated into the AccuMap when they are finalised. They will be integrated with information that recognises the increased information being provided by the electrical information passing down the visual path.

2004 saw exciting contributions to studies of optic neuritis in multiple sclerosis patients conducted by Dr Clare Fraser, who joined the Save Sight Institute in 2004 to do a Masters of Medical Science. The AccuMap has been found to be very sensitive for detecting past or present optic nerve changes related to demyelination - the process that occurs in multiple sclerosis and slows conduction of nerve signals. Dr Fraser is now conducting a larger study of optic neuritis patients recruited from the Save Sight Institute, in collaboration with Dr Ray Garrick (St Vincent's Hospital) and Dr Justin O'Day (Melbourne). Dr Fraser received the Best Young Investigator award for best presentation at the Neuro-ophthalmological Society of Australia meeting and at the Progress in Multiple Sclerosis Research Meeting in Melbourne. The studies were then presented at the North American Neuro-ophthalmological Society in Colorado and again won an award for best presentation by a resident medical officer.

A further study by Dr Tim Roberts is being conducted into 24 hour blood pressure monitoring and oxygen saturation in glaucoma patients. This is based on the knowledge that sleep disturbances such as sleep apnoea may contribute to nocturnal hypoxic events that could be linked to glaucoma progression.

Dr Klistorner and Dr Graham received an NHMRC Development Grant for the investigation of virtual reality goggles as a means of presenting the visual stimulus. Initial trials have been very positive and it is now possible, for the first time, to test both eyes simultaneously. This will halve the time taken to do the test and make inter-eye comparisons more meaningful. The headmounted display has the advantage of being much more compact, being potentially portable and allows for standardising distance to the test screens.

Age-Related Macular Degeneration (AMD)

AMD is responsible for 90% of registered blindness in Australians over 55. It destroys the reading centre of the eye called the macula. The macula is responsible for seeing detail and recognising faces. Macular degeneration is age-related. It is anticipated that by 2020, there will be a doubling of blindness from this cause.

The Institute continues its "bench to bedside" research into AMD. The SSI Retinal Therapeutics Research Unit continues to investigate the use of injections of steroids into the eye (intravitreal triamcinolone or "IVTA") for the treatment of a range of blinding retinal diseases. This treatment has been the subject of laboratory and clinical studies within the SSI for nearly 10 years. The first large randomised clinical trial conducted at SSI did not show that IVTA reduced loss of vision in eyes with wet AMD; however it did slow the growth of the abnormal blood vessels. In 2003 however, the early (3 month) results of a randomized clinical trial of IVTA for diabetic retinopathy showed a very significant improvement in vision and reduction of retinal swelling in treated eyes (see below). It is anticipated that the long-term results of this study will be available in 2005.

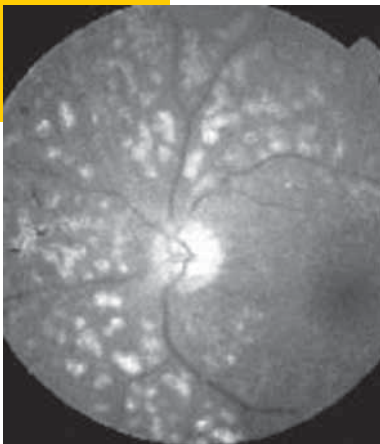
AMD is responsible for 90% of registered blindness in Australians over 55

6. Spectrum of Eye Disease

SSI Research and Response *(continued)*

Diabetic Retinopathy

Diabetes-related blindness occurs at any age and particularly in working life. Every person with diabetes has a twenty-five fold increased risk of losing vision. Many Australians have undiagnosed diabetes and altogether it is estimated that up to 900,000 Australians have diabetes. Aborigines have a much higher incidence of diabetes than other Australian communities. Early diagnosis, careful medical treatment and timely intervention with laser in most cases promise sight for life.



Fundus photo of the retina in diabetic retinopathy

Diabetic retinopathy is due to disease of the small blood vessels in the retina. The SSI Retinal Therapeutics Research Unit is studying the mechanism by which diabetes affects these small vessels and how increased leakage that causes retinal swelling may be prevented. This research has led to the start of a major clinical trial (see AMD section above), in this case of a long acting steroid for retinal swelling, which is the commonest form of loss of vision in diabetes. Studies are also being planned to explore how steroid treatment can best be combined with standard laser treatment.

In other research the SSI Clinical and Digital Media Research group is focusing on improving screening tools and services to ensure early diagnosis and management of the disease in the community.

The SSI is pleased to report that our tele-ophthalmology initiative in the Northern Territory has significantly increased the numbers of remote Aboriginal Communities successfully screened for diabetic retinopathies.

Retinal Dystrophy and Retinitis Pigmentosa (RP)

Retinal dystrophy refers to degenerative diseases of the retina. Retinitis pigmentosa (RP) is one well-known form of retinal dystrophy. It is a hereditary disease, which affects the retina's photoreceptors – destroying their ability to detect colour and light. It is commonly associated with “night blindness”.

Currently there is no known cure for RP or other common dystrophies. SSI molecular and gene array studies aim to unravel the challenging multi-gene links associated with RP. Laboratory research is focused on ways in which the onset of dystrophies can be delayed, or the disease retarded.

7. Teaching Activities



Celebration of retirement of Dr Rao and appointment of Dr Ravi Thomas as Director of LV Prasad Institute, Hyderabad India. (l to r) Professor Frank Billson, Gallapalli (Nag) Rao, Dr Ravi Thomas and Dr Ramachandra Pararajasegaram, Consultant to the World Health Organisation. Dr Thomas trained with Professor Billson in strabismus and glaucoma and was appointed the Professor of Ophthalmology in the Vellore Christian Medical College prior to his appointment as Director of the LV Prasad Institute.

improve the eye health care of our community. The course also facilitates those seeking a position in the Royal Australian and New Zealand College of Ophthalmologists (RANZCO) approved training program.

A further educational development in 2004 was the International Diploma/Masters of Ophthalmology. This will target in the first instance East Timor and the island nations near to Australia. It is planned to start in the first semester in 2005 with students completing the course through the Internet and practical experience in Sydney for eight weeks. The course involves the appointment of local mentors in the region whose full role will be to assist in the transfer of practical clinical skills.



(l to r) Dr Daya de Silva, Dr Saliya Pathirana (President, College of Ophthalmologists, Sri Lanka; Consultant with the Colombo Eye Hospital; Previous Fellow at Save Sight Institute), Mr Desahyamana Lalith Kotalawelle (Chairman, Ceylinc Group of Companies), Professor Frank Billson (Chief Guest) at the 13th Annual Congress of the College of Ophthalmologists of Sri Lanka

Ophthalmic Sciences

The SSI has a distinguished history of 21 years as a centre of excellence in teaching, training and specialty training in clinical skills and research for doctors and medical students in Australia and from overseas. Training and research in 2004 saw 19 students engaged in research by thesis (14 PhD and 5 Masters). Two students had their PhDs conferred and one received a Masters of Medicine.

Together with Sydney Eye Hospital, the SSI has contributed to the training of more than 80% of the ophthalmologists in New South Wales through the Sydney Eye Hospital Registrar Training Program chaired by Professor Frank Billson. In 2004 the SSI and the University of Sydney, in collaboration with the University of Otago in Dunedin, New Zealand, offered a new initiative to the postgraduate students, namely the Graduate Diploma/Masters course in Ophthalmic Science. This course is a distance learning program provided through the Internet with a high level encounter and science underpinning the discipline of clinical ophthalmology.

Fourteen of the students have gone from the Diploma and are undertaking Masters of Medicine by treatise in 2005. The graduates of the course will be able to apply their knowledge in their careers and

SSI Conference and Sydney Eye Hospital Registrar Symposium

These meetings have been held for over 20 years in January and bring together 90% of those in vocational training in Australia and New Zealand. Other eye health professionals are welcomed.

The theme for 2004 was neuro-ophthalmology. The speakers included two distinguished Claffy Lecturers in Dr Peter Savino of Wells Eye Hospital, Philadelphia, and Professor Creig Hoyt from the University of California, San Francisco. Local speakers included Dr Glenda Halliday, Dr Ray Garrick, Dr Justin O'Day and Dr Raf Ghabrial. A further feature of the meeting was a workshop on new investigational technologies in ophthalmology headed by Dr John Grigg. The demonstrations included optical computerised tomography (OCT), confocal microscopy, electrophysiology, discussion and demonstration of electroretinography (ERG), multifocal ERG and multifocal VER (AccuMap). The Organising Committee, including Professor Frank Billson, Dr Adrian Hunt, Dr Maciek Kuzniariz, Dr John Males, Barbara MacDougall and Gisela Payne, collaborated well to make this conference attended by over 100 delegates a success.

7. Teaching Activities *(continued)*

Overseas collaboration and training

The SSI continues to provide vocational training opportunities for postgraduate ophthalmologists from overseas through its international exchange program. Fellows have come from all around the world including the Asia Pacific, the USA and Europe. These relationships include Fellows nominated by the Postgraduate Institute of Medicine, University of Colombo, for Sri Lankan doctors to complete a year with the Institute and the Sydney Eye Hospital and then returning home to take up consultancy posts. In addition to the Sri Lankan doctor Dr Halpitage Padmini, the Institute was joined by Dr Sapna Dave who completed a Paediatric Ophthalmology Fellowship in 2004. Associate Professor Jörgen Larsson from Lund University, Sweden, also joined the SSI and was associated with Associate Professor Mark Gillies' Retinal Therapeutics Research Group; he was involved with "a randomized clinical trial of intravitreal triamcinolone for retinal vein occlusion" study. This trial will explore whether treatment with intravitreal triamcinolone is safe and effective for macular swelling associated with retinal vein occlusion.

Virtual Ophthalmology Clinic

The SSI has developed a revolutionary computer-based teaching program that enables interactions with patients in a virtual clinical setting. The program was developed with a grant to Professor Frank Billson and Dr John Grigg. Each patient's history is recorded. To preserve patient's privacy the stories are learnt and presented by actors. The histories in the archive are programmed to reflect symptoms associated with common eye diseases or complaints. The program allows students to question the virtual patients who are randomly accessed from a digital video archive. Students can learn the importance of the order in which they ask diagnostic questions and gather information, gaining confidence in this essential skill. The

strength of the program is that it allows the candidate to develop skills in interviewing and forming a diagnosis before approaching real patients.

The program includes humour and tiered levels of interaction with the virtual patients who, if questioned badly, can even "lose patience" with the student doctor. Student response and his/her provisional diagnosis is emailed to the supervisor within the education program. The student is then allowed to continue the examination and higher levels of investigation.

This powerful interactive program has been designed and trialled at the SSI. Its success as a teaching and self-development tool highlights the direction of future digital and distance learning initiatives. It also provides a strong platform for modelling other educational tools that support problem solving and diagnostic skills in a variety of disciplines. Plans are underway for the Virtual Ophthalmology Clinic to be integrated into the Graduate Medical Program at Sydney University and also with OceanBrowser, an online learning package developed with Otago University. This will enhance interactive content for students in the Graduate Diploma and Masters Degree in Ophthalmic Science, a distance and onsite learning collaboration between the Universities of Sydney and Otago, which began in 2004.



Professor Frank Billson (centre) international guest to the Ophthalmology Symposium on Ocular Tumours and Workshop on Strabismus, Khota Bharu University Sains Medical School, Malaysia

7. Teaching Activities *(continued)*

Conferences, Seminars and Presentations

Members of the SSI and University of Sydney Discipline of Ophthalmology organised, convened and gave presentations at ophthalmic and vision science conferences, both in Australia and overseas including:

International

February

2nd SERI-ARVO Meeting on Research in Vision and Ophthalmology, Singapore Eye Research Institute, Singapore (Ang, Chong, Lovicu, McAvoy)

April

Accommodation Club, Bascom Palmer Eye Institute, Miami, Florida, USA (McAvoy)
Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting 2004, Fort Lauderdale, Florida, USA (Ang, Chen, Chong, Gillies, Iyengar, Lovicu, McAvoy, O'Connor, Quin, Stump, Wen, Windsor)
Technology to Trends – International Eye Health Symposium, Hyderabad, India (Billson)

May

Wnt Meeting 2004 (Ang, Chong, Lovicu, McAvoy)

June

British Children's Eye Group Meeting and Claud Worth Lecture, Swansea, United Kingdom (Billson)

July

Practical Ophthalmic Science course, University of Otago, New Zealand (Petsoglou)
University Sains Malaysia (USM) Ophthalmology Symposium (Billson)

August

XVII International Congress of Eye Research (ICER), Sydney Convention and Exhibition Centre, Sydney, NSW (Ang, Billson, Chen, Cherepanoff, Chong, Conway, Crouch, Gillies, Graham, Grigg, Iyengar, Jager, Jamieson, Klistorner, Lai, Lovicu, Madigan, Martins, McAvoy, McClellan, Petsoglou, Quin, Stump, Taliana, Tretiach, van Reyk, Windsor, Wyndham, Zhu, Wen)

September

10th International Congress of the Metastasis Research Society, Genoa, Italy (Conway, Crouch, Jager, Lai, Madigan)
13th Annual Congress of the College of Ophthalmologists, Sri Lanka (Billson)
Annual Congress of the Chinese Ophthalmological Society, Wuhan, China (Gillies)

October

MacTel Foundation Roundtable Conference, Baltimore, USA (Gillies)

November

International Orthoptic Conference, Melbourne, Victoria (Narayan)
Wnt and GSK Group London Meeting, King's College London, Guy's Hospital Campus, England (McAvoy)

December

National Conference for Cornea and Eye Surface Diseases, Southwest Hospital and Southwest Eye Hospital, Chongqing, China (Zhu)

7. Teaching Activities *(continued)*

National

January

Sydney Eye Hospital 17th Annual Registrar Conference - Neuro-ophthalmology and Paediatric Ophthalmology, Sydney, NSW (Billson, Grigg)

February

XXII Cornea and Eye Bank Meeting, Sydney Hospital and Sydney Eye Hospital, Sydney, NSW (Billson, Petsoglou, Zhu)

March

Australia and New Zealand Glaucoma Club, Gold Coast, Queensland (Grigg)

Hunter Valley Cellular Biology Meeting, Pokolbin, NSW (McAvoy)

NSW State Branch Annual Scientific Meeting RANZCO, Leura, NSW (Grigg, McClellan, Petsoglou)

May

GPCE General Practitioner Conference & Exhibition, Sydney, NSW (Grigg, Petsoglou)

June

Australian Ophthalmic Nurses Association (AONA), Sydney, NSW (Grigg, McClellan, Petsoglou)

School of Optometry and Vision Science, UNSW, Sydney, NSW (Lovicu)

July

Sydney Eye Hospital Alumni Meeting, Sydney, NSW (Billson, Fraser, Garrick, Graham, Grigg, Hooper, Klistorner, Martins)

October

Physician's Workshop Program, Concord Hospital, Sydney, NSW (Gillies)

November

Multiple Sclerosis Society of Australia Annual Meeting, Melbourne, Victoria (Fraser, Graham, Grigg, Klistorner)

Neurophthalmology Society Meeting, Melbourne, Victoria (Fraser, Garrick, Graham, Grigg, Klistorner)

Nursing Seminars: Nursing in Paediatric Ophthalmology and Ophthalmic Nursing teaching session at Sydney Eye Hospital (Petsoglou)

RANZCO 36th Annual Scientific Congress, Melbourne, Victoria (Billson, Gillies, Graham, Grigg, Hooper, Klistorner, Martins, McClellan, McDougall, Petsoglou)

Victor Chang Cardiac Research Institute, Sydney, NSW (McAvoy)

December

IVth Annual Young Investigator Symposium, Institute of Biomedical Research, University of Sydney, Sydney, NSW (Ang, Chen, Chong, Iyengar, Lovicu, McAvoy, Patkunanathan)

7. Teaching Activities *(continued)*

Postgraduate Students in 2004

Allende, Alexandra - PhD (Medicine) - Regulation of choroidal blood vessel growth during development and ageing of macula
Supervisors: Assoc Prof J Provis, Prof P McCluskey

Ang, Sharyn L - MSc Med (Research) - Growth factors in the maintenance of lens epithelial cells
Supervisors: Prof JW McAvoy, Dr F Lovicu

Balachandran, Chandrashekar - PhD (Research) - Multifocal perimetry in glaucoma
Supervisors: Prof FA Billson, Dr SL Graham, Dr A Klistorner

Cherepanoff, Svetlana - PhD (Medicine) - Retinal immune microenvironmental changes in age related macular degeneration
Supervisors: Assoc Prof MC Gillies, Dr P Penfold

Chen, Yong Juan - PhD (Research) - The Wnt signalling in lens development
Supervisor: Prof JW McAvoy

Chong, Colin CW - PhD (Medicine) - Transforming growth factor-beta in the resolution of ocular wound healing
Supervisors: Prof JW McAvoy, Dr F Lovicu, Dr P Healey

Graham, Stuart L - PhD (Medicine) - Development of a technique for objective perimetry in the assessment and early detection of glaucoma
Supervisors: Prof FA Billson, Prof P Mitchell

Ho, I-Van - PhD (Research) - Cost effective analysis of tele-ophthalmology in remote communities of the Northern Territory
Supervisors: Prof FA Billson, Dr N Verma

Lai, Kenneth - MSc Med (Research) - Effect of UV on Ocular Melanoma
Supervisors: Dr M Madigan, Dr N Di Girolamo

Lawlor Mitchell - PhD (Research) - The sensory predominance of vision and associations with eyes: opportunities and limitations for eye banking and corneal donation in NSW
Supervisor: Prof FA Billson

Ly, Cameron - MSc Med (Research) - Antibiotic susceptibility of ocular surface bacteria in keratitis
Supervisor: Dr K McClellan

Martins, Alessandra A - MM (Research) - Investigation of spectral (Blue-Yellow) colour objective perimetry in normal states and the early detection of visual field defects in diseased states
Supervisors: Prof FA Billson, Dr S Klistorner

O'Connor, Michael - PhD (Medicine) - Reconstruction of the mammalian lens
Supervisors: Prof JW McAvoy, Dr FJ Lovicu

Quin, Godfrey J - PhD (Medicine) - The effect of laser treatment on retinal vascular leak in diabetic retinopathy
Supervisor: Assoc Prof MC Gillies

Sandercoc, Trent M - PhD (Medicine) - Vascular development in primate retina
Supervisors: Assoc Prof J Provis, Dr P Penfold

Tretiach, Marina L - PhD (Medicine) - Effect of peripheral cells on retinal capillary endothelial cell permeability
Supervisors: Assoc Prof MC Gillies, Dr P Penfold

Van Pham, Trong - PhD (Medicine) - Eye disorder surveying in HIV+ and AIDS patients in Vietnam
Supervisors: Dr P Penfold, Prof P McCluskey

Wederell, Elizabeth - PhD (Medicine) - Role of integrins in lens development and cataract
Supervisors: Prof JW McAvoy, Dr RU de Jongh

Wyndham, Jennifer R - PhD (Medicine) - Role of matrix metalloproteinases in regulation of vascular permeability
Supervisors: Assoc Prof MC Gillies, Prof JW McAvoy

Students enrolled for MMed (Ophth Sci) Coursework and Treatise

Bahrami, Fareed	Hersch, Dov	Samarakoon, N
Berman, Edwina	Howden, Juliette	Swamy, Brighu
Chan, Grace	Lawlor, Mitchell	Tan, Teng
Chan, Kenny	Leong, James	Townsend, Bradley
Fung, Adrian	Leung, Yi Gordon	

Degrees awarded in 2004

Chang, Andrew - PhD (Research) - Interaction of indocyanine green dye with ocular tissues: implications for the diagnosis and treatment of retinochoroidal disease.
Supervisors: Prof F Billson, Dr M Zhu

Georges, Pierre - MSc Med (Research) - Differentiation and function of Muller cells in the developing human retina
Supervisors: Assoc Prof J Provis, Dr M Madigan

Wong, James G - PhD (Medicine) - Age-related macular degeneration
Supervisors: Dr P Penfold, Prof FA Billson

8. Community Activities in Australia

Lions NSW Eye Bank

The Lions NSW Eye Bank has been intimately associated with the SSI since the Institute took up residence on Macquarie Street in 1997.

The Eye Banks of Australia have been working closely together during this time. 2004 marked a further advance in cooperation in the formation of Eye Banks Australia and New Zealand (EBANZ) bringing together the Eye Banks of Australia and New Zealand with a goal of setting high standards in providing corneas for sight saving corneal transplant surgery in both countries. EBANZ seeks common standards and the promotion of eye donation and the facilitation of corneal transplantation nationally. Monthly meetings of the members of EBANZ occur with teleconference meetings aimed at addressing common eye banking issues and formalising standard eye banking procedures to mirror European and American standards.

The Therapeutic Goods Administration (TGA) has become increasingly involved in the setting of standards and auditing of Eye Banks and seeks to play a role in solid organ donation. Also given that holding of corneas for transplantation has much in common with solid organ donation, the Lions NSW Eye Bank has acquired skills relevant to all forms of holding of tissue for transplantation and this has been recognised and emphasised by the TGA.

The Lions NSW Eye Bank, as its name implies, reflects the joint enterprise between Lions Clubs of NSW, the SSI and the Department of Health in NSW through the South Eastern Sydney Area Health Service.

The contribution of staff in public and private hospitals, the Forensic Departments of NSW, the State Coroner's Office of NSW and members of the community all make a vital contribution.

In 2004, 456 sight saving corneal surgeries were performed as a result of the generosity of individuals and their families who agreed to the donation of eyes for corneal transplant. The decision to be a donor needs to be shared with the family. The Lions NSW Eye Bank makes every attempt to fulfil the wishes of the deceased, which may have been indicated on a driver's licence or the National Organ Donor Registry. The Eye Bank coordinators provide ongoing educational seminars to medical/nursing staff in our hospitals, and informative talks to community members to facilitate eye donation when a family consents.

The coordinators continue to gain community trust and seek to make eye donation accessible to all people and the decision of family members as easy as possible under difficult circumstances. The positive outcome of donation is seen by many to assist in the grieving and healing process and is always handled in a very sensitive and caring manner.

Corneal blindness is the third most common cause of world blindness. People of all ages, young children to the elderly, are currently waiting in NSW for a corneal transplant. Of those on the waiting list 50% are under the age of 40. There is no upper age limit to being a donor. The Eye Bank and the SSI are engaged in various research projects, such as the implementation of organ culture, aimed to increase the availability of corneas for sight saving corneal transplantation. Some families also agree to research if the eyes are not suitable for surgery. Medical and scientific research conducted in the SSI laboratories has increased our understanding of and the development of improved therapy for blindness caused by conditions such as cataract, retinal and diabetes related eye diseases, and macular degeneration.

In conclusion, as Director of the Lions NSW Eye Bank, I acknowledge the tremendous contribution the Eye Bank staff are making to the community of NSW and join with them in thanking all those people in the community who make eye donation and corneal transplantation possible. These people make that contribution without fuss or without seeking recognition. Finally the SSI thanks the Lions Sable Sight Foundation and the Lions Clubs of NSW for their continuous support. Without them hundreds of people would not benefit from the modern miracle of restoration of sight from corneal transplantation.

Frank Billson AO

Director

8. Community Activities in Australia *(continued)*

Save Sight Clinical Services

Clinical work is an important link between the Institute's teaching and research activities. The SSI and Sydney Eye Hospital share in the training of the next generation of ophthalmologists. Training occurs in the metropolitan teaching hospitals, including Sydney Eye Hospital, with country rotations that extend to Lismore, Wagga Wagga, Northern Territory and Tasmania.

Clinical Research

Clinical research in the SSI together with clinical research in the Sydney Eye Hospital represents a partnership critical to the future of eye care. This collaboration, starting over 20 years ago, has resulted in major contributions to improved surgical and medical care providing sight not previously possible for children and adults. In 2004 the research focus continued to be in clinical trials on age-related macular degeneration (AMD) using photodynamic therapy and on glaucoma.

The Institute provides a resource for the Sydney Eye Hospital in its special clinical services and its research in the diagnosis, treatment and management of childhood eye disease, ocular cancer and AMD. Special areas of expertise and research interest include the management of cataract, glaucoma, corneal diseases and ocular tumours in children.

Clinical Services to Remote Areas of Australia and Tele-ophthalmology

In 2004 the SSI and the Sydney Eye Hospital provided a fibre optic (fast exchange of information) link between the University and health institutions in New South Wales metropolitan and rural areas, providing for clinical services and the opportunity for skills transfer.

The SSI works with St John Ambulance through two important branches, firstly the Community Care Branch, reaching school children with reading problems and older Australians, and secondly the Ophthalmic Branch, that provides support for the Jerusalem Eye Hospital serving the Palestinians. The organisation also extends service for eye health care particularly in rural communities in Australia, shares initiatives in the Northern Territory and Macquarie Area Health Service with the SSI, and collaborates with Flinders Medical Service in Alice Springs.

Outreach Program

A very exciting Outreach Program was launched in August 2004 with the opening of an Eye Health Service in the Thubbo Aboriginal Medical Co-operative by the Minister of Health and Ageing The Hon Tony Abbott MP. It represents a joint project in Eye Health between the Aboriginal people and the community as represented by St John Ambulance Australia, who funded the ophthalmic equipment, and the SSI. The service will complement and extend existing public services in the Macquarie region, New South Wales.

Thubbo Aboriginal Medical Medical Co-operative will provide a primary healthcare service with support from visiting ophthalmologists working within the rural area, as well as support from the Sydney Eye Hospital and the SSI. It will be available to screen and provide treatment particularly in respect of diabetic complications, such as sight-threatening diabetic retinopathy, which is prevalent amongst the Aboriginal population. There will be provision of a diode laser. The project will also facilitate detection of other eye conditions including cataract. The Eye Clinic will also be able to provide a tele-ophthalmic service for eye examination - transmission of information to Sydney and local facilities, and real-time ophthalmic advice and consultation.

The project is particularly exciting because it gives members of the Aboriginal community ownership and participation in their eye health. In addition, the project will interface with the Dubbo Clinical School allowing medical students to experience an aspect of health services relevant to Aboriginal people and their extension into remote and rural areas.

The Outreach Program continues in the Katherine area, a community that has 90% indigenous Australians, complemented with a glasses program providing holistic eye health care. Dr Rob McKay provides laser treatment services, visiting rural communities associated with Darwin, Katherine and Goh. In Alice Springs, Dr Tim Henderson runs a similar Outreach Program from Alice Springs.

9. Community Activities in World Ophthalmic Health

Foresight Australia

Foresight Australia was established in 1978, the founding year of the Chair of Ophthalmology in the University of Sydney, through the efforts of Major General Paul Cullen and Professor Frank Billson.



Foresight's Recycled Glasses Program volunteers, Miss Doris Flood and Mr John Wilmott

Foresight is a charitable Australian international non government organization. It is committed to the elimination of a avoidable blindness worldwide but particularly in the Asia Pacific region. The major burden of blindness occurs in poverty stricken countries. Alleviation of blindness empowers communities through an inexpensive technology to be able to contribute to the future of their families and their country.

Foresight was initially formed to assist Bangladesh where it played a role in establishing the Chittagong Eye Infirmary and Training Complex and the establishment of a Chair of Community Ophthalmology in the Institute of Community Ophthalmology. It had support from AusAid in the early years but later there was some scepticism as to the future of Bangladesh. Seventeen years on the Chittagong Eye Infirmary and Training Complex became self supporting. Ophthalmologists have been trained at eight base hospitals throughout Bangladesh and 2003 saw the one millionth cataract intraocular lens implantation performed through those trained in the program. Currently

Foresight is supporting the establishment of a Children's Eye Care Centre in Katchara providing paediatric services, immunisation and medicines, health education for mothers and supplementary feeding for children who are malnourished. The Centre services 16,000 children a year.

Foresight is part of a team working with the Royal Australasian College of Surgeons and, with support from AusAid, contributes through its membership to provide services to the near island nations of Australia in particular the Solomon Islands. Dr Geoffrey Painter has led a team to the Solomon Islands for the last nine years.



Professor Billson examining a baby in Bangladesh

Foresight's presence in East Timor started just after the civil war. Dr Nitin Verma, a Director of Foresight, has led a team supported by AusAid and the Royal Australasian College of Surgeons. A number of ophthalmologists associated with the Institute have participated including Dr John Kearney, Dr Ali Martins, Dr Stephen Ong and Dr Max Conway.

Foresight's activities have been enhanced with donations and bequests. Miss Christina Gordon's bequest in 2003 has led to the establishment of Fellowships in the region and Dr Mundi Qalaw as one of those recipients of a Fellowship. Dr Qalaw will complete a Diploma of Ophthalmology at the University of Papua New Guinea and seeks to convert that to an International Masters in Ophthalmology with the SSI.

Foresight has added a special dimension to the activities of the SSI and the SSI's staff are included among those who are asked to visit East Timor and the near island nations.

A special problem is training and certification of training in the region. The development of an International Diploma/Masters of Ophthalmology in the SSI has provided a special opportunity to provide training for doctors in the near island nations who wish to serve their own people and remain near their families, while gaining the educational opportunity of the internet, supplemented by a two month visit to Australia for training programs.

9. Community Activities in World Ophthalmic Health (continued)

The cost effectiveness of Foresight programs depends on staff who make tremendous contributions to the Agency so that more than 90% of all donations goes to ward projects.

This report would not be complete unless special mention is made of our volunteers who work with the Recycled Glasses Program: Mr Paul Davis, Mr John Wilmott, Mr Donald McDonald, Mr Livio Siviz and Miss Doris Flood, with Mrs Anne Leach, Mrs Elizabeth Thilo and Miss Mary Kane providing administration support. These volunteers are responsible for putting a human face on the activities of Foresight Australia. Their activities are in addition to the sight saving surgery and improvement in the quality of life by improving vision and our special glasses program that attracts increasing Australian community support.

Finally, Foresight, in association with the SSI, is well placed to add a special dimension to its programs in the future. The advent of new developments in information technology and the Internet together with access and faster communication through fibre optic and satellite hold further promise of increased educational opportunity. The SSI is developing a proposal for a new International Masters Degree and Graduate Diploma of Ophthalmology to be launched in 2005 which will provide the necessary study and training for aspiring ophthalmologists in the South Pacific region as well as some countries in the Western Pacific area. The courses will be helpful in establishing local capacity in the field of ophthalmology and the prevention of blindness in the region.

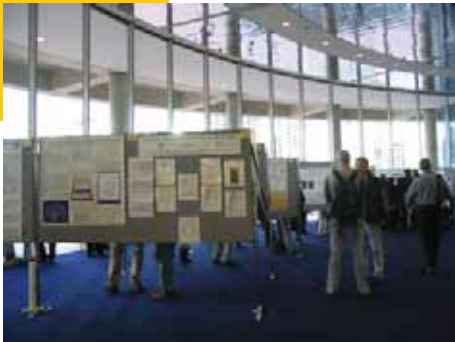


Waiting patients, Bangladesh



Premature babies ward in Bangladesh

10. International Congress of Eye Research



Poster session at ICER

International Congress of Eye Research at Darling Harbour

A major event in 2004 for SSI was the XVI International Congress of Eye Research (ICER) held at the Sydney Convention & Exhibition Centre from 29th August to 3rd September 2004. This biennial conference brings together leading eye and vision scientists, both basic and clinical, from all around the world to share their latest research. This major event on the eye research calendar has been previously hosted in a variety of international locations including San Francisco, Helsinki, Strasa, Delhi, Yokahama, Paris, Santa Fe and Geneva. The initial bid to host the congress in Sydney in 2004 was won by Professor John McAvoy against strong opposing bids from China and USA.

SSI scientists took on the lion's share of the conference organization. The local committee was chaired by Professor John McAvoy and included Associate Professor Mark Gillies and Dr Frank Lovicu. SSI researchers also hosted many visits to the Institute during the week and many eminent researchers toured the facilities and were introduced to the broad range of clinical and basic research activities at SSI. Many were impressed by the proximity of the Eye Hospital and the strong integration of clinical and basic approaches to studying the major blinding diseases at SSI.

The organizers put together an exciting scientific program of symposia. All together there were over 90 symposia covering the main sections of Cornea and Ocular Surface, Glaucoma, Lens, Physiology & Pharmacology, Retina (both cell biology and visual neurosciences), Immunology & Inflammation, and General Eye and Vision Research. Special Interest Symposia that addressed topics with broad interdisciplinary interest including Ocular Development, Molecular Genetics, Stem Cells, Imaging the Eye, and Research Based Outcomes in Developing World Ophthalmology were also scheduled. World leaders in these research areas gave keynote addresses and in accordance with efforts to encourage greater participation of young investigators at all levels of the meeting, there were special Young Investigator Symposia. Poster Sessions were organised thematically to provide a forum for the continued and more expansive coverage of topics addressed in the symposia.

The meeting was well attended and there were over 730 registrations and 690 presentations. SSI hosted a function on the evening of the last day of the conference. In addition to delegates from the meeting, this was attended by members of SSI Board of Directors and Professor Anne Sefton, the Pro-Vice Chancellor of The University of Sydney. This function was held in the historic courtyard of the Sydney Hospital & Eye Hospital. Guests enjoyed canapés, fine wines and a chamber group from the Sydney Conservatorium of Music completed the classical ambience. This convivial evening was a fitting end to a stimulating and exciting meeting.

11. Clinical and Laboratory Research

A powerful interface between clinical and laboratory research

The SSI provides a powerful interface between two domains of vision science research – clinical and laboratory.

Clinical Research - Professor Frank Billson

Clinical research at the SSI, supported by national and state research grants from the Sydney Foundation for Medical Research, the Ophthalmic Research Institute of Australia (ORIA) and the Federal Government, has a major focus in age-related macular degeneration (AMD). New therapies to suppress the leaking of blood vessels in the reading centre of the eye in AMD and diabetic eye disease are being trialled at the Institute. A new technique, orbital computerised tomography (OCT) is proving a most sensitive way to study clinical images showing cross sections of the retina in patients, revealing disturbances in diabetes and AMD. With objective perimetry field-testing we are also trialling new therapies for glaucoma. This testing provides early detection of glaucoma. In addition children are being studied and monitored using the AccuMap after early detection of tumours of the visual pathway.

Research continues into glaucoma therapy and visual field assessment using the AccuMap. This instrument, developed from intellectual property within the SSI (see page 16), is now within the public domain and used in clinical practice in Australia. It has continued to excite international interest. It recently gained approval and licence from the prestigious American Federal Drug Administration (FDA) to be distributed in the USA. The AccuMap has won two Australian Design Awards and orders continued to grow in 2004. There is growing recognition of the value of this equipment for the diagnosis of glaucoma in adults and children.

Research in cancer therapy has shown the promise of the diode laser as an important adjunct therapy. A new initiative has been the development of a novel method of treating melanoma exploiting immunology and attracting radioactive (alpha) particles to antibodies that target the tumour. This work is in collaboration with Professor Barry Allen, Cancer Care Centre and St George Hospital. It is hoped this approach will accurately target and kill tumour cells.

During 2004 we have worked to establish the Eye Research Genetics Group. The SSI through the Group will establish collaborative links with the Discipline of Paediatrics and Child Health at the Children's Hospital at Westmead and the Children's Medical Research Institute. Initial funding support is coming through the Institute. The aim of the program is to open the way for new and better treatments and management of the causes of genetic eye disorders which contribute to blindness and partial sightedness for many in our community.

Laboratory Research - Professor John McAvoy

Research in the SSI laboratories is aimed at understanding the molecular and cellular basis of the major blinding diseases. Although the research groups at the SSI work on different ocular cells and tissues, they often apply similar approaches and technologies to investigate fundamental biological and pathological processes. For this reason building up 'state-of-the-art' facilities to investigate normal and aberrant cellular behaviour has been a high priority. Successful grant applications to NHMRC, Ramaciotti Foundation, Sydney Eye Hospital Foundation, Sydney Foundation for Medical Research, Rebecca Cooper Foundation, Ophthalmic Research Institute of Australia, Honda Foundation, University of Sydney and some generous donors have made possible the steady acquisition of the latest equipment for molecular cell biology and conventional, confocal and electron microscopy. Having these core facilities in-house has provided a major boost to the efficiency and capabilities of all research groups.



11. Clinical and Laboratory Research *(continued)*

A unifying theme at SSI is the identification of factors that regulate the behaviour of cells in health and disease. In retina research good progress has been made in identifying factors important for normal retinal blood vessel development and growth. In particular, progress has been made in understanding the special features of the central retina (macula), which is responsible for fine vision. These features include an absence of retinal blood vessels, a high density of light sensing cells (cone photoreceptors) and special wiring of nerve cells. Defining these specialisations is important for understanding why the central retina is vulnerable to degeneration during aging. A better understanding of the factors that influence the permeability of the retinal blood vessels has also emerged from this research. As many blinding diseases are caused by leaky blood vessels it is vital to understand how 'tight junctions' form and how they are maintained in the retinal vasculature. Similarly in the lens the maintenance of cell-cell adhesion and a regular packing arrangement is critical for maintaining transparency and normal lens function. Good progress has been made in identifying the factors in the lens environment of these ocular tissues that control their adhesion, proliferation and differentiation.

Common also to the lens and retina is the vitreous humour. This ocular fluid contains many important factors that influence the behaviour of lens and retina cells. SSI research has already identified vitreous factors that have important roles in retina and lens. One example is the FGF family of growth factors. A novel finding is that FGFs bring about different cellular responses at different concentrations. This has been shown to be a common feature of a number of different tissues and is a key mechanism for governing spatial patterns of differentiation and growth in the lens. Recent studies indicate that a similar dose-dependent response to FGFs may be operating during retinal development. Clearly many more key regulatory factors in the ocular media (both aqueous and vitreous) have yet to be identified. For example, FGF from vitreous has been shown to be a potent initiator of lens fibre cell differentiation; however, this process does not progress normally without the addition of fresh vitreous. Identification of this fibre-promoting factor would bring closer the possibility of regenerating functional lenses from epithelial 'stem cells'. Similarly the SSI retina groups are working to identify factors in the vitreous (and other ocular tissues) that can regulate normal and pathological blood vessel growth and function.

Factors involved in growth and invasion of primary eye tumours in children (retinoblastoma) and adults (melanoma) are also being studied at SSI. These factors (for example, enzymes such as matrix metalloproteinases - MMPs) contribute to tumour cell and blood vessel invasion of nearby ocular tissues, and tumour spread to the rest of the body. Several MMPs and an MMP-inducing protein expressed by tumour cells have been described in eye melanoma. Tumours depend on blood vessels to supply nutrients for growth, however recent studies in eye melanoma also described a system of channels formed by melanoma cells ('vasculogenic mimicry') that complement the blood supply and may potentially contribute to long-term survival of certain types of tumours, for example, eye melanoma. Targeting these channels as well as the blood supply may be important for controlling eye melanoma growth, and research into how these channels form is being conducted.

Fundamental to these research projects is the ability to carry out analysis and identification of the proteins in ocular fluids (and tissues). Research in this area, known as proteomics, received a major boost at the end of 2004 with the finalisation of the agreement for Associate Professor Roger Truscott's move to SSI. Associate Professor Truscott will move from University of Wollongong to SSI in 2005. This group works on the biochemical and molecular basis of cataract and will complement the existing strengths in lens cell biology at SSI. Importantly this group will bring strengths in proteomics research that will be valuable to all research groups at SSI. It will add new dimensions to the analysis of the protein profiles of ocular tissues and how they change during normal development and in pathological conditions.

Another important development in 2004 was growth of the activities of the 'Molecular Genetics' group led by Drs Robyn Jamieson and John Grigg. This recently formed group at SSI have identified a novel human gene known as ADSI that is associated with autosomal dominant cataract. A mouse orthologue has also been identified and sequence conservation of this gene exists down to zebrafish. This exciting finding indicates that this evolutionarily conserved gene has a key, but yet to be defined, role in normal lens structure/function and that its dysregulation leads to cataract.

Whilst this growth in new activities at SSI during 2004 has led to strengthening and diversification of research, it has also brought new challenges. Getting the necessary equipment, additional laboratory space and infrastructure support will require many grant submissions for new equipment/facilities as well as much activity on the fund raising scene. However, as in the past, the generosity of our supporters and the competitiveness of our grant applications will ensure that we are well placed for a new phase of growth in cutting-edge eye research at SSI.

12. Funded Research Projects

Biodiem Pty Ltd

Researcher: Gillies M.

Title: In vitro and in vivo testing of a novel tetrapeptide as a treatment for retinopathy.

Funding: \$150,000 for 2004-2005

Cooperative Research Centre, The Vision CRC

Researchers: McAvoy JW, Lovicu F, Stump R.

Title: Research partner involved in studies on prevention of presbyopia.

Funding: 2003-2007, \$50,000 per annum.

Eli Lilly

Researcher: Gillies, M.

Title: Reduction in Occurrence of Centre-Threatening Diabetic Macular Edema.

Funding: \$150,000 for 2004-2008.

Eyetechn Pharmaceuticals

Researcher: Gillies, M.

Title: Phase II/III randomised double-masked controlled, dose-ranging, multicentre comparative trial in parallel groups to establish safety & efficacy of intravitreal injections of EYE001 (anti-VEGF pegylated aptamer) every 6wks for 54 weeks in patients with exudative AMD.

Funding: \$700,000 for 2002-2005.

Researcher: Gillies, M.

Title: A phase II randomised, controlled, double-masked, dose-finding, multi-centre, comparative trial, in parallel groups, to establish the safety and preliminary efficacy of intravitreal injections of EYE001, given every 6 weeks for 12 to 30 weeks to patients with clinically significant diabetic macular edema (CSME) involving the centre of the macula.

Funding: \$50,000 for 2003-2005.

Juvenile Diabetes Research Foundation

Researchers: Gillies M, Sutter F.

Title: A randomized clinical trial of intravitreal triamcinolone for diabetic macular oedema.

Funding: US\$110,000 for 2003-2005.

National Health and Medical Research Council (NH&MRC)

Researchers: de Iongh RU, McAvoy JW.

Title: Expression and role of integrins during lens development and cataractogenesis.

Funding: 2002-4, \$110,000 per annum.

Researchers: McAvoy JW, Lovicu FJ.

Title: Inductive interactions between lens and optic vesicle specify cell fates.

Funding: 2003-2005, \$85,000 per annum.

Researchers: Lovicu FJ, Rasco J.

Title: Growth factor induced signalling pathways involved in the regulation of lens cell behaviour.

Funding: 2004-2006, \$83,250 per annum.

12. Funded Research Projects *(continued)*

Researcher: Conway RM.

Title: Protein Truncation Testing for Germline Retinoblastoma Mutations.

Funding: Neil Hamilton Fairley Postdoctoral Fellowship 2002–2005, \$85,000 per annum.

Researcher: Quin G.

Title: Proteomic analysis of diabetic and laser-treated retinæ.

Funding: Postgraduate Scholarship \$80,000 for 2002-5.

National Institutes of Health (USA)

Researcher: McAvoy JW.

Title: Lens differentiation and cataract: role of FGF, RA & Wnt.

Funding: 2002-2007, US\$100,000 per annum.

Novartis

Researcher: Gillies, M.

Title: A phase II, multicentre, randomised, double-masked, active treatment-controlled study of the efficacy and safety of rhuFab V2 (Ranibizumab) compared with Verteporfin (VisudyneR) photodynamic therapy in subjects with predominantly classic subfoveal neovascular age-related macular degeneration.

Funding: \$30,430 for 2004-2006.

Ophthalmic Research Institute of Australia

Researcher: Gillies M,

Title: A randomized clinical trial of intravitreal triamcinolone for diabetic macular oedema.

Funding: \$41,000 per annum

Rebecca Cooper Medical Research Foundation Limited

Researcher: Madigan MM.

Title: Factors involved in vascularisation of tumours.

Funding: 2004: \$12,894.

Sydney Foundation for Medical Research

Researcher: McAvoy JW.

Title: Normal and pathological lens development in relation to cataract.

Funding: 2000-2005, \$206,195 per annum.

Researcher: Madigan MM.

Title: Vascular Growth and Tumour Invasion in Retinoblastoma and Uveal Melanoma.

Funding: 2002-2006: \$115,000 per annum.

Equipment and infrastructure grants awarded to SSI

Honda Foundation: \$13,302 towards digital camera and image analysis system.

NHMRC: \$31,694 towards inverted fluorescence microscope workstation.

Sydney Eye Hospital Foundation: \$24,588 towards inverted fluorescence microscope work station.

NSW Health Department Infrastructure Grants: Special Infrastructure Grant: \$594,450 for July 2003-June 2006.

13. Publications in 2004

SSI vision science research papers are regularly published in major ophthalmic publications worldwide.

Ang SJ, Stump RJW, Lovicu FJ, McAvoy JW. (2004). "Spatial and temporal expression of Wnt and Dickkopf genes during murine lens development." *Gene Expression Patterns (previously Mechanisms of Development)* 4: 289-95.

Balachandran C, Klistorner AI, Billson F. (2004). "Multifocal VEP in children: its maturation and clinical application." *British Journal of Ophthalmology* 88(2): 226-32.

Birkebaek NH, Patel L, Wright NB, Grigg JR, Sinha S, Hall CM, Price DA, Lloyd IC, Clayton PE. (2004). "Optic nerve size evaluated by magnetic resonance imaging in children with optic nerve hypoplasia, multiple pituitary hormone deficiency, isolated growth hormone deficiency, and idiopathic short stature." *Journal of Pediatrics* 145(4): 536-41.

Bjerre A, Grigg JR, Parry NR, Henson DB. (2004). "Test-retest variability of multifocal visual evoked potential and SITA standard perimetry in glaucoma." *Investigative Ophthalmology & Visual Science* 45(11): 4035-40.

Chang AA, Zhu M, Billson F A, Kumar NL, Beaumont PE. (2004). "Indocyanine green localization in surgically excised choroidal neovascular membrane in age-related macular degeneration." *British Journal of Ophthalmology* 88(2): 307-9.

Chen Y, Stump RJW, Lovicu FJ, McAvoy JW. (2004). "Expression of Frizzleds and Frizzled-related proteins (Sfrps) during mammalian lens development." *International Journal of Developmental Biology* 48: 867-77.

Conway RM, Schlötzer-Schrehardt U, Kuchle M, Naumann GO. (2004). "Pseudoexfoliation syndrome: pathological manifestations of relevance to intraocular surgery." *Clinical and Experimental Ophthalmology* 32(2): 199-210.

Conway RM, Themel S, Holbach LM. (2004). "Surgery for primary basal cell carcinoma including the eyelid margins with intraoperative frozen section control: comparative interventional study with a minimum clinical follow up of 5 years." *British Journal of Ophthalmology* 88(2): 236-238.

Conway RM, von Moller A, Ballhausen W, Junemann A, Holbach LM. (2004). "Frequency and clinical features of visceral malignancy in a consecutive case series of patients with periorbital sebaceous gland carcinoma." *Graefes Archive for Clinical and Experimental Ophthalmology* 42: 674-678.

Cornish EEG, Hendrickson AE and Provis JM. (2004) "Distribution of Short Wavelength Sensitive Cones in Human Fetal and Postnatal Retina: Early Development of Spatial Order and Density Profiles." *Vision Research* 44: 2019-2026.

Cornish EEG, Natoli RC, Hendrickson AE and Provis JM. (2004). "Differential distribution of fibroblast growth factor receptors (FGFRs) on foveal cones: FGFR-4 is an early marker of cone photoreceptors." *Molecular Vision* 10: 1-14.

Cornish EEG, Xiao M, Zhantao Yang Z, Provis JM, Hendrickson AE. (2004). "The role of opsin expression and apoptosis in determination of cone types in human retina." *Experimental Eye Research* 78: 1143-1154.

de Jongh RU, Chen Y, Kokkinos MI, McAvoy JW. (2004). "BMP and activin receptor expression in lens development." *Molecular Vision* 10:566-76.

Gillies MC, Simpson JM, Billson FA, Luo W, Penfold P, Chua W, Mitchell P, Zhu M, Hunyor AB. (2004). "Safety of an intravitreal injection of triamcinolone results from a randomized clinical trial." *Archives of Ophthalmology* 122(3): 336-40.

Kottler U, Conway RM, Schlötzer-Schrehardt U, Holbach LM. (2004). "Isolated neurofibroma of the orbit with extensive myxoid changes: a clinicopathologic study including MRI and electronmicroscopic findings." *Orbit* 23: 65-70.

Lovicu FJ, Ang S, Chorazyczewska M, McAvoy JW. (2004). "Deregulation of lens epithelial cell proliferation and differentiation during the development of TGFβ-induced anterior subcapsular cataract." *Developmental Neuroscience* 26: 442-451.

13. Publications in 2004 (continued)

Lovicu FJ, Steven P, Saika S, McAvoy JW. (2004). "Aberrant lens fiber differentiation contributes to anterior subcapsular cataract formation in vivo: a process dependent on reduced levels of Pax6." *Investigative Ophthalmology & Visual Science* 45: 1946-53.

Martins A, Klistorner A, Graham S, Billson F. (2004). "Effect of check size and stimulation rate on blue-yellow multifocal visual evoked potentials." *Clinical & Experimental Ophthalmology*. 32(3): 270-4.

Sharan S, Painter P, Grigg JR. (2004). "Total hyphema following postoperative enoxaparin (Clexane)." *Eye: advance online publication* 3 September 2004.

Sutter FK, Simpson JM, Gillies MC. (2004). "Intravitreal triamcinolone for diabetic macular edema that persists after laser treatment: three-month efficacy and safety results of a prospective, randomized, double-masked, placebo-controlled clinical trial." *Ophthalmology* 111(11): 2044-9.

Tanaka T, Saika S, Ohnishi Y, Ooshima A, McAvoy JW, Liu CY, Azhar M, Doetschman T, Whei-Yang Kao W. (2004). "Fibroblast growth factor 2: Roles of regulation of lens cell proliferation and epithelial-mesenchymal transition in response to injury." *Molecular Vision* 10: 462-7.

Thompson J, Lovicu F, Ziman M. (2004). "The role of Pax7 in determining the cytoarchitecture of the superior colliculus." *Development Growth & Differentiation*. 46(3): 213-8.

Tretiach ML, Madigan MC, Gillies MC. (2004). "Conditioned medium from mixed retinal pigmented epithelium and Muller cell cultures reduces in vitro permeability of retinal vascular endothelial cells." *British Journal of Ophthalmology* 88: 957-961.

Viestenz A, Conway RM, Kuchle M. (2004). "Tapioca melanoma of the iris mimicking a vascular tumour: a clinicopathological correlation." *Clinical and Experimental Ophthalmology* 32(3): 327-330.

Walsh N, van Driel D, Lee D, Stone J. (2004). "Multiple vulnerability of photoreceptors to mesopic ambient light in the P23H transgenic rat." *Brain Research* 1013: 194-203

Book Chapters

Agarwal A, Maloof AJ, Agarwal S, Agarwal A. (2004). "Sealed capsule irrigation device." In 'Advances in Ophthalmology, Vol. 2'. Eds Garg A, Pandey SK, Chang DF, Papadopoulos PA and Maloof AJ. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

Lang RA, McAvoy JW. (2004). "Growth factors in lens development." In 'Development of the Lens.' Eds Lovicu FJ, Robinson M. Cambridge University Press, New York.

Pandey SK, Apple DJ, Werner L, McAvoy J, Maloof AJ, Milverton EJ. (2004). "Posterior Capsule Opacification: Experimental and Clinical Studies and Factors for Prevention." In 'Advances in Ophthalmology, Vol. 2'. Eds Garg A, Pandey SK, Chang DF, Papadopoulos PA and Maloof AJ. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

Pandey SK, Coroneo MT, Werner L, Milverton EJ. (2004). "Anterior capsule staining during cataract surgery." In 'Advances in Ophthalmology, Vol. 2'. Eds Garg A, Pandey SK, Chang DF, Papadopoulos PA and Maloof AJ. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

Pandey SK, Olsen RJ, Werner L, Mamalis N. (2004). "Microincision intraocular lenses." In 'Advances in Ophthalmology, Vol. 2'. Eds Garg A, Pandey SK, Chang DF, Papadopoulos PA and Maloof AJ. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

Pandey SK, Werner L, Apple DJ. (2004). "Update on viscoanaesthetic solutions for cataract and refractive surgery." In 'Advances in Ophthalmology, Vol. 2'. Eds Garg A, Pandey SK, Chang DF, Papadopoulos PA and Maloof AJ. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

14. Financial Statements

Save Sight Institute Statement of Financial Performance for the year ended 31 December 2004

	31 December 2004 \$	31 December 2003 \$
Income		
Grants and HECS	1,184,588	1,203,210
Scholarships, Donations and Bequests	138,820	179,598
Business & Investment Income	170,740	118,261
Fees and Charges	242,121	221,572
Internal & Other Income	588,253	511,070
Total Income	2,324,522	2,233,710
Expenditure		
Salaries	1,335,094	1,208,177
Consumables	171,274	136,917
Equipment & Repairs/Maintenance	170,414	377,088
Services and Utilities	24,228	25,475
Travel	97,673	40,605
Conference and Entertainment	1,856	19,677
Other Expenses	275,688	285,671
Business Group Expenses	— 435	
Total Expenditure	2,076,227	2,094,044
Surplus	248,295	139,666
Accumulated Funds as at 1 January	838,701	699,035
Total Accumulated Funds	1,086,996	838,701

Notes to the Financial Statements for the year ended 31 December 2004

1. Statement of Significant Accounting Policies

- a) These accounts have been prepared on a cash basis and amounts are stated at historical cost.
- b) Income tax is not applicable to activities of the Foundation.
- c) All fixed assets are expensed in the year of purchase.

2. Suspense

The amount of \$13,780 is being held on behalf of a disbanded organisation.

14. Financial Statements *(continued)*

Save Sight Institute Balance Sheet as at 31 December 2004

	31 December 2004 \$	31 December 2003 \$
Assets		
Current Assets		
Expense Advance	—	1,065
Funds Participating in University Pool Interest	1,102,233	851,416
Total Current Assets	<u>1,102,233</u>	<u>852,481</u>
Total Assets	<u><u>1,102,233</u></u>	<u><u>852,481</u></u>
Liabilities		
Current Liabilities		
Accrued Expenditure	1,457	—
Suspense Account (see note 2)	13,780	13,780
Total Current Liabilities	<u>15,237</u>	<u>13,780</u>
Net Assets	<u><u>1,086,996</u></u>	<u><u>838,701</u></u>
Equity		
Accumulated Funds	1,086,996	838,701
Total Equity	<u><u>1,086,996</u></u>	<u><u>838,701</u></u>

I certify that the Statements of Financial Performance and Financial Position have been prepared in accordance with the University's accounting practices and procedures and reflect the transactions as recorded in the University's general ledger.



B P McLaughlin FCPA
College Manager, Finance & Resources
College of Health Sciences
February 3, 2004

15. Major Donations

The SSI would like to thank all of our supporters who have, over the last year, helped us to continue our research, teaching and community awareness programs. Listed below are the major contributors for the year 2004.

Corporate/Industry organizations

Advanced Medical Optics
Alcon Laboratories Australia Pty Ltd
Allergan
Designs for Vision
Device Technologies
Northbridge-Cammeray Masonic Hall Co Pty Ltd
Pfizer Ophthalmic
The Royal Australian and New Zealand College of Ophthalmologists (New South Wales Branch)
The Royal Australian and New Zealand College of Ophthalmologists

Foundations

Claffy Foundation
Friends of Sydney Eye Hospital
Lions NSW-ACT Save Sight Foundation
Sydney Eye Hospital Foundation

Gold Members

Mr Robert Albert AO & Mrs Elizabeth Albert
Mr Robin Apter & Mrs Janet Apter
Prof Frank Billson AO & Mrs Gail Billson
Mr Graham Brown
Mr Ken Coles & Mrs Rowena Danziger
Mr Rick Damelian
Miss Joyce Fardell
Dr Colleen McCullough
Mrs Mabs Melville
Mr Michael O'Dea
Dr Justin Playfair
Lady Laurine Proud
Mr Christopher J & Mrs Jane C Recny
Miss Alison Stephen
Dr Richard Stump
Margaret Thom
Mrs Gaeling Tosio
Mrs Caroline Wilkinson
The Sam Issa Family Trust

Lion Clubs – Gold

Lions Club of Grenfell
Lions Club of The Entrance
Lions Club of Ulladulla Milton

Silver Members

Emeritus Professor Richard E Collins
Mr S E & Mrs R M Collins
Mr R G & Mrs P M Dighton
Mr Bill Ewan
Ms Edit Gillott
Mrs Angela Kay
Mr Peter Ketley
Dame Leonie Kramer
Sir John Mason
Ms Janette Parkinson & Mr Roy Fernandez AO
Mrs Marno Parsons AM
Mr L O & Mrs H D Payne
Mr John Rankine
Mr R Arthur Salenger
Mr Stephen Stux
Dr M A Scully
Dr Derrick Woodhouse

Lions Clubs - Silver

Lions Club of Branxton
Lions Club of Engadine
Lions Club of Jerrabomberra
Lions Club of Killarney-Bateau
Lions Club of Lugarno
Lions Club of Nowra
Lions Club of Oatley
Lions Club of Queanbeyan
Lioness Club of Toukley
Lions Club of Wauchope

Members

Mr Ian M Angus
Mrs Florence Best
Mr W Bothamley
Mr Norman & Mrs Eva Bristow
Mrs Pamela Chippindall
Mrs Florence Chirnside
Miss Marjorie Cotter
Mr John Culkin
Mr Robert Cunneen
Mrs R L Doyle
Travers Dunne

15. Major Donations (continued)

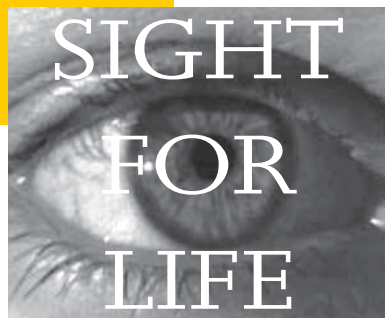
Mr Grahame & Mrs Anne Evans
Mrs Ross Field
Prof & Mrs Ramzi Fayed
Mr George Foster
Mr John Griffin
Prof Richard & Mrs Margaret Gye
Mrs Jeanne E Hale
Mr Paul Hannan
Dr Stephen A Hing
Miss Heather Howie
Dr G & Mrs G Horowitz
Mrs Marjorie Jones
Mrs Sylvia Kline
Mr John Marcon
Mrs Marie-Therese Maurel
Mr Harold McBurney
Dr Kathy McClellan
Ms June L Miles
Mr R W Moody
Dr Rowan Nicks OBE
Mr Matthew & Mrs Kristin Potter
Mrs Pamela Reid
Mrs Marion R Stuart
Mr Donald Taylor
Mrs H E Treacy
Mr & Mrs W J Utiger
Mr Barry Walker
Mr Colin Watson OAM
Dr & Mrs A W Wechsler
Dr H G Wong
Mrs Dorothy A Wood
Mr William Workman
Mr W J Youll OAM & Mrs M Youll

Lions Clubs - Members

Lions Club of Adamstown
Lions Club of Bingara
Lioness Club of Camden
Lions International Bankstown Club
Lions Club of Gilgandra
Lions Club of Gosford City
Lions Club of Gundagai
Lions Club of Hallidays Point
Lions Club of Jesmond
Lions Club of Kings Langley
Lions Club of Marulan & Districts
Lions Club of Nambucca Heads
Lions Club of Oat Flats
Lioness Club of Oat Flats
Lions Club of Parramatta

Lions Club of Penrith
Lions Club of South Tamworth
Lions Club of South Wagga Wagga
Lions Club of Sutherland Shire
Lions Club of Sydney Markets Industries
Lions Club of Tottenham
Lions Club of Toukley
Lions Club of Tumbarumba
Lions Club of Wagga Wagga South
Lions Club of Wangi Wangi
Lions Club of West Wyalong
Lions Club of Winston Hills
Lions Club of Wyoming
Lions Club of Yamba

16. Share the Vision ... Invest in the Future



Bequests and Donations ensure the future of the Save Sight Institute.

Bequests & Donations

Donations over \$2 are tax deductible.

A bequest could take one of the following forms in your Will.

Money

I GIVE to the Save Sight Institute, the University of Sydney, the sum of \$..... which I direct to be paid to the Honorary Treasurer of the Save Sight Institute to be applied for the purposes of the Save Sight Institute in such manner as the Council of Governors may determine.

Property

I GIVE to the Save Sight Institute, the University of Sydney, my property (insert address) or (my shares, debentures, etc. and describe them, e.g. BHP shares) to be applied for the purposes of the Save Sight Institute in such manner as the Council of Governors may determine.

General

If you wish to leave the whole or part of your estate:

I GIVE to the Save Sight Institute, the University of Sydney, the whole (or specified percentage or the residue) of my estate or whatsoever nature or kind and whatsoever situated, to be applied for the purposes of the Save Sight Institute in such manner as the Council of Governors may determine.

For further information, please contact the Save Sight Institute on:

Telephone: (02) 9382 7302

Facsimile: (02) 9382 7372

Email: sightsavers@eye.usyd.edu.au

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9382 7302

**Share with us
a vision of
Sight for Life!**