SINGAPORE EYE RESEARCH INSTITUTE

SIGHT MATTERS

Annual Report FY2018/2019

CONTENT PAGE

ABOUT US

Established in 1997, the Singapore Eye Research Institute (SERI) is Singapore's national research institute for ophthalmic and vision research. It is the research arm of the Singapore National Eye Centre, and affiliated to the National University of Singapore and the Duke-NUS Medical School. In two decades, SERI has grown from a team of 5 to over 196 staff, encompassing clinician scientists, scientists, fellows, students, support staff, as well as more than 223 distinguished adjunct faculty members to become the largest eye research institute in the Asia-Pacific region. As of Mar 2019, SERI has published 3,504 peer-reviewed papers supported by $310 million in competitive research grants. SERI has trained more than 195 current and past graduate students; and has been conferred over 556 national & international awards and 131 patents. SERI further undertakes eye research in collaboration with local & international ophthalmic medical centres and research institutions, which has ensured a high level of research competency & skills transfer. Notably, SERI's research has translated to actual patient success stories & significant improvements in eye care delivery. Today, SERI is recognized as a pioneering center for high quality eye research in Asia, with breakthrough discoveries that has translated to significant paradigm shift in eye care delivery.

CHAIRMAN'S MESSAGE

Looking back on FY2018, I would like to again congratulate the SERI team on amassing an impressive track record of securing close to $30 million of competitive grants, and producing 333 scientific papers this year. A significant number of our faculties were awarded numerous national and international awards, which recognized their excellent work in eye research. We also see our effort in commercialization has culminated in some key licensing deals of our existing technologies.

SELENA, an Al-based Retinal Image Analysis for Diabetic Retinopathy (DR) Screening was successfully licensed to a multi-national medical device company, covering several major markets globally. Additionally, the enhanced version of the software was patented and licenced to SERI's start-up company EyRIS, a joint venture with a local healthcare IT company. The enhanced version is expected to be incorporated in the Singapore Integrated Diabetic Retinopathy Screening Programme (SiDRP), which will then become the first AI-aided national screening programme for DR. Other than SELENA, we continue to see the expansion of licences of our Low Dose Atropine (Myopine™) across the world.

I am happy to welcome Professor Jonathan who joined SNEC/SERI as Professor of the newly established Duke-NUS Centre for Vision Research (CVR), and Senior Clinician Scientist of SNEC. Prior to taking up this appointment in Singapore, Jonathan was the Managing Director of the Centre for Eye Research Australia (CERA) as well as the Ringland Anderson Professor and Chair of Ophthalmology at the University of Melbourne. In his new role, Jonathan will build up his research programme in the CVR, while providing support to clinical and academic teaching at SNEC and Duke-NUS.

I am also glad to see the conferment of SingHealth Duke-NUS Kwan Im Thong Hood Cho Temple Professorship in Ophthalmology to Professor Aung Tin, the Executive Director of SERI. As a highly accomplished ophthalmologist and researcher, Prof Aung Tin is instrumental in designing and conducting key research studies in the field of angle closure glaucoma. The conferment of the distinguished Professorship is a true embodiment his dedication and leadership in the field of ophthalmology and visual sciences. We must also thank our generous donor, the Im Thong Hood Cho Temple, who made it possible for Prof Aung Tin to continue his excellent work in glaucoma research.

As the leading research institution in Myopia research, SERI was chosen by the International Agency for the Prevention of Blindness (IAPB) and the World Health Organisation (WHO) to host the Western Pacific Region Meeting on Myopia. The meeting was attended by key member organizations of IAPB and key delegates from member countries of WHO. Following the meeting, a report which summarizes the 19 main themes that emerged from the discussion and a set of recommendations for the member states as well as for NGOs and WHO was published in the WHO website. We are excited to see our research effort being translated into patient treatment, and resulted in new changes in international policy. As recommended by WHO, SNEC is also setting up the Myopia Centre–to address Myopia as a public health need.

As part of the SingHealth-Duke-NUS Academic Medical Centre, SERI and SNEC will continue to work hand-in-hand in delivering evidence-based medicine to our patients through innovation and research.

Professor Wong Tien Yin
Chairman

EXECUTIVE DIRECTOR'S MESSAGE

As we celebrate the 21th anniversary of SERI in Sentosa, I cannot help but feel that SERI has entered a new era in the institutional history- one noted by greater collaboration both locally and internationally, in private and public sectors, and in expanded diversity of fields to achieve our vision of Asia's global centre of excellence in eye and vision research.

Our pursuit for translating basic science to clinical prevention and treatment of sight threatening disorders and delivering best care for our patients has been further empowered by our new partners who each brings their own strength and value to the forefront of vison research.

Besides joining force with Santen, SERI continues to grow our collaboration with industrial parties. SERI has embarked on a S$31.5 million SERI-Johnson & Johnson Vision Care (JJVC) Programme for Myopia Research, jointly funded by ASTAR and JJVC. This new partnership leverage on the R&D capabilities of both parties, and intends to focus on tackling the growing myopia epidemic in Asia and around the world, through developing new technologies in ophthalmology.

To further enhance the influence and impact of our research outcome in the region, SERI and AIER, the largest private eye hospital chain in China are exploring collaboration opportunities in the area of eye research and other strategic domains.

Other than working with the private sector, as Singapore's national research institute for ophthalmic and vision research, SERI was successful in leading a team of retinal specialists, senior clinician scientists, epidemiologists, population health experts, psychometricians, and basic scientists from across the universities, the healthcare clusters and research institutions in Singapore and elsewhere to secure a S$24 million Large Collaborative Grant on "Translational clinical research program in Asian AMD and Polypoidal choroidal vasculopathy (TAAP)" for 5 years. The proposed "bench-to-bedside-to-population" programme in addressing the scientific and clinical gap in Asian AMD and Polypoidal Choroidal Vasculopathy (PCV).

Lastly, SERI and NTU have jointly established the **S**ERI-N**T**U **A**DVA**N**CED O**C**ULAR **E**NGINEERING (STANCE) programme, which serves as a broader initiative to engage with TTSH/NHG Eye Institute to further consolidate SERI's national role, and to ensure that SERI's research continue to be globally competitive. To this end, SERI and NTU will work together in the field of ocular engineering, with a key focus on optical imaging. The emphasis of the programme will be on translation of medical technology, with significant opportunities for clinical utility and commercialization.

In a Nature report published in 2012, Jonathan Adams found that on average, its current Letters (short articles) have at least four times more authors than they did 60 years ago. In addition, papers with 100 or more authors have rose tremendously since 1980s. By 2011, there were 120 physics papers with more than 1,000 authors and 44 papers with 3,000 [1]. In today's world, the best science is done through collaborations, and it is heartening to see that SERI is not alone in this battle with ocular diseases and visual disabilities.

Professor Aung Tin
Executive Director

INSTITUTIONAL REPORT

BACKGROUND

The Singapore Eye Research Institute (SERI), affiliated to the Singapore National Eye Centre, the National University of Singapore, and the Duke-NUS Medical School is a non-profit charitable organization tasked to lead and conduct research into vision and eye diseases based in Singapore and focused on Asia. It further works in collaboration with Ophthalmology departments of the various public healthcare entities and biomedical research institutions, as well as major eye centers and research institutes throughout the world. SERI has developed a world-leading reputation in broad-based clinical translational research and epidemiological programs for many eye diseases, specifically eye diseases endemic to Asia, such as myopia, angle closure glaucoma, and corneal diseases.

KEY PERFORMANCE INDICATORS

- SERI is one of the largest research institutes in Singapore and the largest eye research institute in the Asia-Pacific, with a faculty of 196, encompassing clinician scientists, scientists, fellows, students, and support staff.

- SERI has successfully secured external peer-reviewed competitive grant funding worth approximately S$ 29.87 million this year, and a cumulative quantum of approximately S$310 million.

- SERI continues its leading performance in publication, with 333 scientific papers this year, and with a cumulative publication quantum of 3,504 scientific papers.

- As of March 2019, the SERI faculty has received 556 national and international awards with 131 patent applications being filed during the same period.

- Since 1997, SERI has conducted 1632 studies, encompassing the entire spectrum of eye research, from basic laboratory research, pre-clinical animal research, translational clinical research, and population health research. There are currently 411 ongoing research projects at SERI, of which approximately 70% cover clinical/translational research, 12% basic research and 18% epidemiology, imaging and health service research.

- SERI has further contributed to the training of research manpower, including over 195 Masters, PhD and post-doctoral students, many of whom are now working in hospitals, biomedical sciences industry, academic institutions and research institutes locally and overseas.

ACHIEVEMENTS & INNOVATIONS

- **S$31.5 Million SERI-Johnson & Johnson Vision Care (JJVC) Programme for Myopia Research Programme**

  SERI has embarked on a S$31.5 million SERI-Johnson & Johnson Vision Care (JJVC) Programme for Myopia Research, jointly funded by the Singapore government and JJVC. This myopia research programme intends develop innovative and impactful solutions for the global myopia epidemic by bringing together the two parties' capabilities in ophthalmic R&D.

  The Programme for Myopia Research represents exciting new fields of research and product development for SERI & JJVC. This first-of-its-kind public-private strategic partnership in Asia focused on myopia will create a deeper understanding of how the condition develops, how it progresses and how it may be intercepted. It will focus on developing predictive tools to identify those who may be at risk to develop high myopia, conduct research on the underlying mechanisms of myopia, progress novel therapies, and discover and validate methods to prevent the onset and progression of the condition.

  Thus far SERI has developed a long track record in myopia research (specifically in areas of myopia retardation (low dose atropine), epidemiological studies and light-related mechanisms), however, the approach and research into the disease has been largely fragmented. It is therefore our hope that with the consolidation and convergence of these efforts under one umbrella, together with strong support and a potential commercialization avenue via JJVC, this will allow SERI to elevate our translational research capabilities in the field of myopia research, from which will emerge new and impactful treatment modalities and strategies for this disease that will be world-leading.

- **Commercialization Success – Licensing Deals for Myopine™ and SELENA**

  The Technology Development and Commercialization (TD&C) team at SERI, led by Dr Danny Belkin continues to pursue commercialization opportunities, as part of efforts to develop further revenue streams for SERI.

  Some of the success stories are as follows:

  <u>SELENA: AI-based Retinal Image Analysis for DR Screening</u>

  SELENA was licensed to Carl Zeiss in February 2017. This license covers major markets globally for Diabetics Retinopathy screening. In addition, an enhanced version of SELENA with additional modules for detection of glaucoma suspects (GS) and Age-related Macular Degeneration (AMD) has been patented.

  Additionally, SERI and NUS have spun off a company ("EyRIS") as a joint venture with a local healthcare IT company in February 2018. EyRIS is currently exploring bringing this AI innovation to a wider market external to Singapore. The SERI team is concurrently working with IHIS towards integrating the enhanced SELENA system as part of the national Singapore Integrated Diabetic Retinopathy Screening Program (SiDRP), with the ultimate aim to be the world's first AI-integrated national screening program for DR screening. EyRIS is also coming closer to gaining formal HSA approval for the SELENA algorithm.

Low Dose Atropine (Myopine™)

Low dose atropine (Myopine™) has already been licensed as a means to slow down the progression of myopia in:

- Singapore, China, Japan, Malaysia, Netherlands, Portugal, Italy, Thailand, Philippines, Cambodia, Laos, Myanmar, Hong Kong, Korea.
- On-going discussions with potential licensees for the UAE, New Zealand and Australia.

On the basis of preclinical work underlying the ATOM3 clinical trial, a new patent on the prevention of Myopia was filed in 2017. Pending positive results from the clinical trial, this would serve as a substantial boost for Myopine™ as it would allow us to claim a distinct advantage that no other product within the myopia therapeutics market currently possesses.

- **SERI's 21st Anniversary Celebration**

  SERI turns 21st year old on 3rd November 2018. As part of the staff engagement efforts and to ensure that SERI faculty are involved in the celebratory planning process, SERI has organized a contest to solicit staff's suggestions/ideas for the 21st anniversary celebration. Staff suggestions were then collated, reviewed and shortlisted by the SERI Strategic Planning Committee. A staff-led committee was then convened to execute the planning and the organization of the winning idea.

- **Joint WHO-IAPB-BHVI Western Pacific Region Meeting 2018**

  SERI was chosen by the International Agency for the Prevention of Blindness (IAPB) and the World Health Organisation (WHO) to host the Western Pacific Region Meeting on Myopia. This was held on 13-14 November 2018 at the Academia, SGH Campus.
  The objectives of the meeting were to use the existing evidence around myopia evidence and control to support policy development through:

  a) an update on existing strategies and approaches to reduce the burden of myopia
  b) identifying effective activities to address the burden of myopia in countries, and
  c) fostering collaborations for implementation, in line with Towards Universal Eye Health: A regional action plan for the Western Pacific

  The meeting was attended by key member organizations of IAPB and key delegates from member countries of WHO.

- **Conferment of SingHealth Duke-NUS Kwan Im Thong Hood Cho Temple Professorship in Ophthalmology to Professor Aung Tin**

  The Kwan Im Thong Hood Cho Temple Professorship in Ophthalmology was conferred to Professor Aung Tin.

  The distinguished Professorship, which was made possible with a generous gift of S$3 million by the Kwan Im Thong Hood Cho Temple, honours an eminent individual who has contributed significantly to clinical innovation and research in the field of ophthalmology and visual sciences.

  Not only is Professor Aung Tin a highly accomplished clinician scientist in ophthalmology with numerous international awards, he is also instrumental in establishing a leading research programme on angle closure glaucoma. He is also the world leading KOL in the area of PACG, a disease that remains a major cause of blindness across the world, especially in Asia.

The conferment of this distinguished Professorship was an endorsement of Prof Aung Tin's dedication and hard work in the field of Ophthalmology. It would enhance efforts by the Eye ACP, SNEC and SERI to ensure better outcomes in eye-care delivery.

- **S$24 Million Open-Fund Large Collaborative Programme for Age-Related Macular Degeneration Research**
  SERI was successful in securing a S$24 million LCG grant on AMD for 5 years.

  The programme, ie ***Translational clinical research program in Asian AMD and Polypoidal choroidal vasculopathy (TAAP),*** integrated retinal specialists, clinician-scientists, and basic scientists from across major research institutes in Singapore, Asia and US. The proposed "bench-to-bedside-to-population" 5-linter-linked themes will address key research questions:

  Theme 1 (Population Health) will determine how common the AMD/PCV is and what are the factors leading to increased risk of AMD/PCV in Asians to help plan future preventative interventions.

  Theme 2 (Pathophysiology) will examine the underlying pathophysiological changes at the cellular/molecular/ genetic level in AMD in cell-based and animal experiments.

  Theme 3 (Novel Imaging Biomarkers) will exploit a multitude of novel imaging technology in collaboration with industry partners to find ways in which imaging can help guide treatment to achieve better outcome.

  Theme 4 (Therapy) will test and develop new therapeutic strategies through multi-centre clinical trials.

  Theme 5 (Quality Of Life) will determine how AMD/PCV affects the quality of life in Asian patients, the cost on healthcare and investigate the effect of new behavioural therapy to improve coping strategies in patients.

  TAAP will build on strong track record of our team of investigators and their ongoing international collaborative network and strong industry support. The broad-based research proposed has high potential for commercialization and significant clinical and population outcomes that will lead to blindness reduction from AMD by 20% within 10 years.

- **SERI-AIER Collaboration**
  SERI was approached by AIER, the largest eye hospital chain in China for collaboration opportunities in the area of eye research, and working with SNEC in the areas of clinical services, education, and hospital management and consultancy.

  The SERI-AIER strategic alliance will explore potential research area for collaboration, and other research infrastructure/strategy domains, where the two groups can work together.

- **SERI-NTU Advanced Ocular Engineering (STANCE) Programme**
  SERI and NTU established the **S**ERI-N**T**U **A**DVA**N**CED O**C**ULAR **E**NGINEERING (**STANCE**) programme, which includes the setting-up of a SERI-NTU Joint Imaging Laboratory.

  The emphasis of this 3-year program will be on translation medical technology, with significant opportunities for clinical utility and commercialization. This broad program will serve as a conduit to generate individual projects, with each project governed by a separate individual project agreement. The project agreement will spell out the specific project's scope of work, timelines, contributions by both parties, deliverables, IP and sharing ratio etc.

  SNEC-SERI and NTU have contributed S$2.5 million each to this initiative. For longer-term sustainability, SERI and NTU intend to jointly apply for the IAP funding, in addition to other competitive national grants.

PERFORMANCE OVER THE PAST TWENTY-TWO YEARS

- SERI has amassed an impressive array of publications over the years, increasing both in quantity and quality over the past several years.

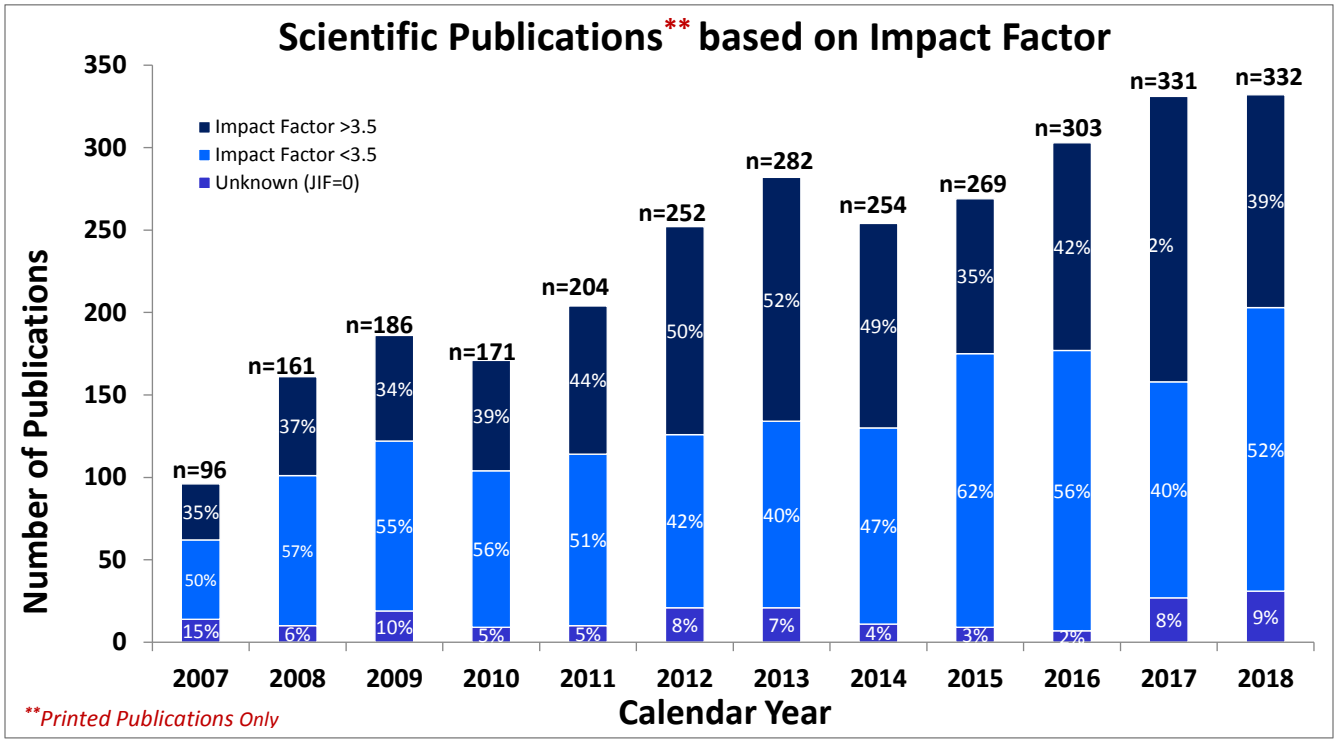


Figure 1: Number of yearly publications published at SERI

- SERI stands out as one of the most productive institutions and well holds up against global heavyweights in the field.

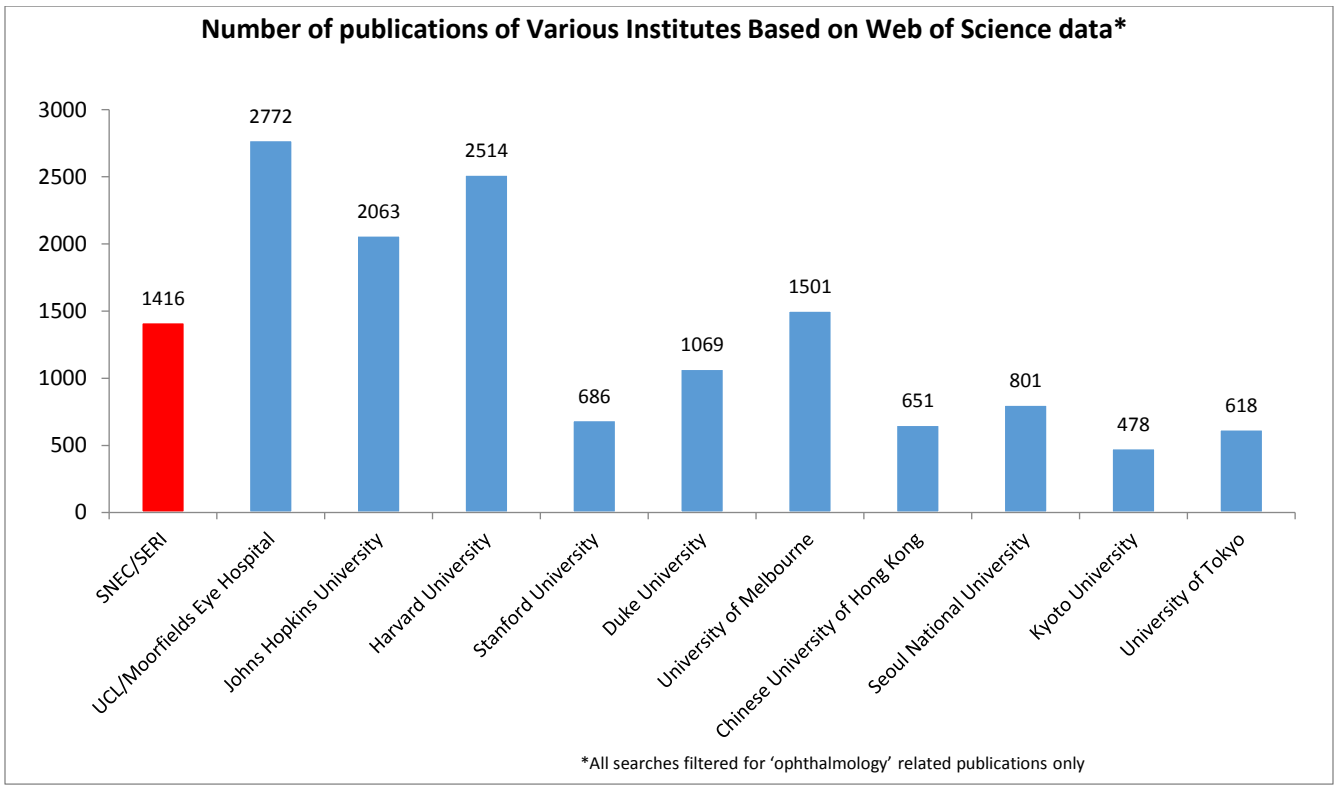


Figure 2: Number of publications by SERI and other institutions around the world, during the period of 2012 - 2019

- SERI's staff strength over the years.

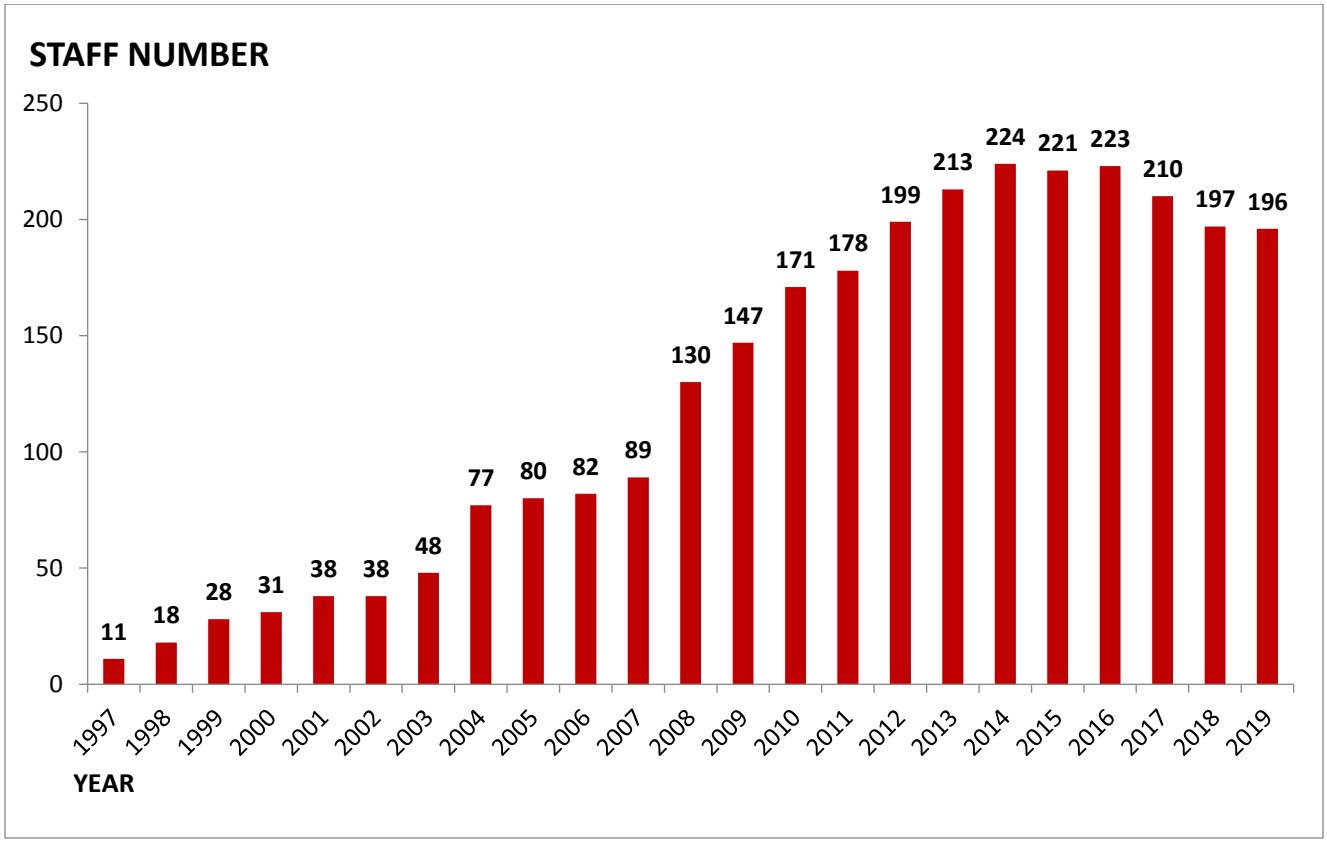


Figure 3: Number of staff members at SERI

- SERI boost from a diverse and global faculty that serves as melting pot of ideas that propels innovation.

Figure 4: Nationalities of staff members at SERI

- The stellar achievements of SERI have been well endorsed with numerous international and local awards.

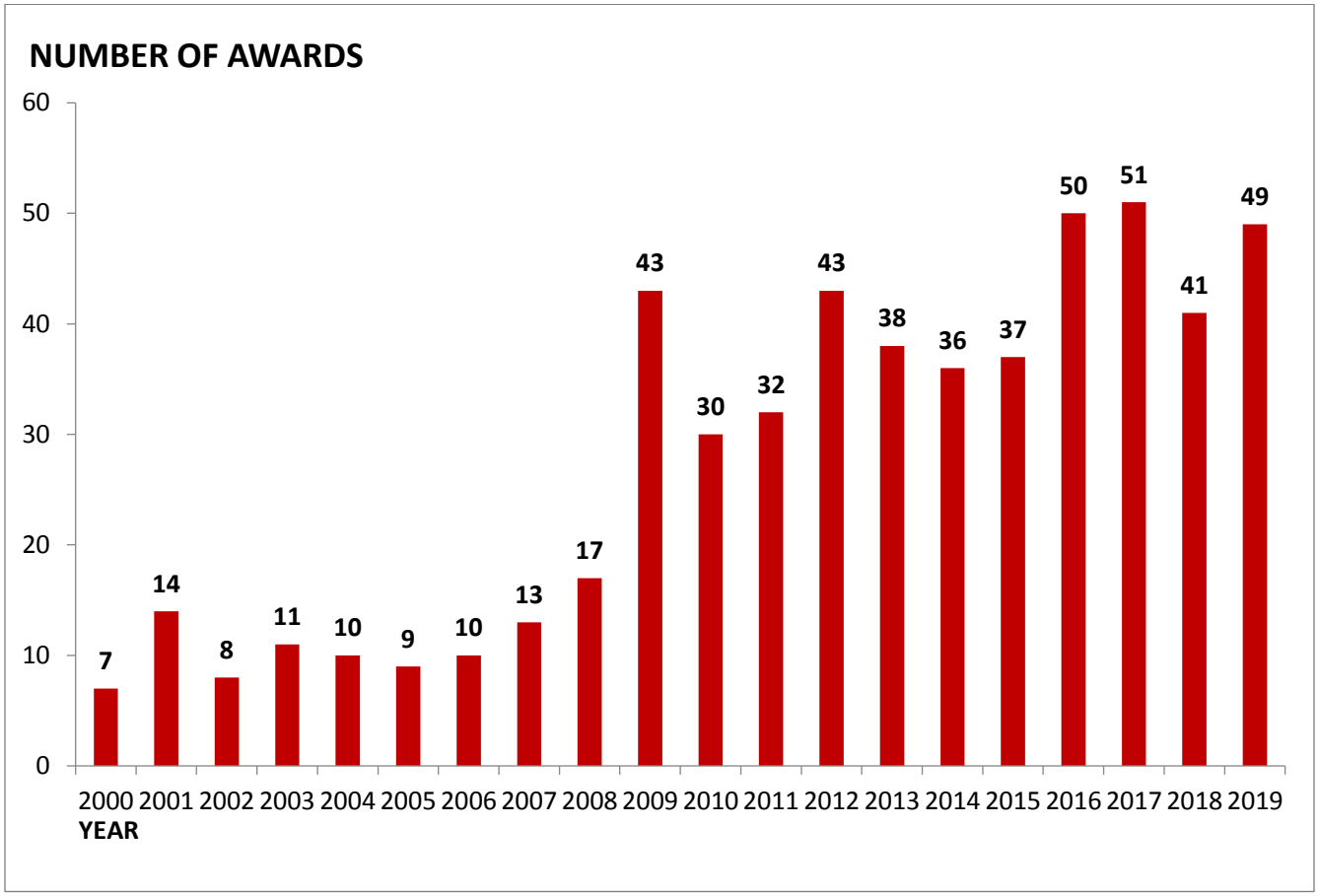


Figure 5: Number of awards received by SERI and its staff (Data from 1997-1999 are not available)

APPRECIATION & ACKNOWLEDGEMENT

SERI owes its success to its people – the honorable SERI Board of Directors, our eminent academic collaborators, the senior management, and clinicians of the Singapore National Eye Centre (SNEC), as well as, very importantly, the SERI faculty and staff members.

However, our greatest gratitude is reserved for our patients and their families. They are the driving force behind all that we do. Indeed, their journey and courage spur us on in our research endeavors and make us determined to make a positive difference to their vision and their lives.

SERI would also like to extend our appreciation to the National Medical Research Council, the Biomedical Research Council, the National Research Foundation, as well as our industry collaborators for their generous funding and support. It enables us to continue in our pursuit of impactful research with the ultimate aim to alleviate vision loss and blinding eye diseases.

OUR PEOPLE

SERI's BOARD OF DIRECTORS

SERI's Memorandum and Articles of Association stipulates that the SERI Board of Directors shall have at least one representative each from the Ministry of Health, the National University of Singapore and the Singapore National Eye Centre. Today, besides representation from the above three organizations, SERI's Board additionally has Directors from the Duke-NUS Medical School, Lee Kong Chian School of Medicine, SingHealth, National Healthcare Group as well as M C Tong Cardiothoracic Surgery Pte Ltd.

Prof Wong Tien Yin
Medical Director,
Singapore National Eye Centre

Chairman,
Singapore Eye Research Institute

Prof Ang Chong Lye
Senior Advisor,
SingHealth

Senior Consultant,
Singapore National Eye Centre

Prof Soo Khee Chee
Senior Visiting Consultant,
SingHealth

Senior Advisor
Dean's Office, Duke-NUS Medical School

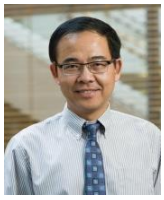
Prof Lim Tock Han
Deputy Group CEO (Education & Research),
National Healthcare Group

Senior Consultant,
NHG Institute, Tan Tock Seng Hospital

Prof Chong Yap Seng
Dean, Yong Loo Lin School of Medicine
National University of Singapore

Prof James Best
Dean,
Lee Kong Chian School of Medicine

Prof Thomas Coffman
Dean,
Duke-NUS Medical School



Prof Wang Linfa
Program Director,
Emerging Infectious Diseases
Duke-NUS Medical School

Assoc Prof Vernon Lee
Director (Communicable Diseases),
Ministry of Health

Dr Geh Min
Consultant Eye Surgeon,
M C Tong Cardiothoracic Surgery Pte Ltd

Ms Ooi Chee Kar
Chartered Accountant (*Singapore*)

SERI's DIRECTORS / STRATEGIC PLANNING COMMITTEE

The SERI Directors/ Strategic Planning Committee serves as the highest governing body at SERI, working closely with the Executive Director, SERI to ensure the overall stewardship of the Institute; leading and promoting research within the Institute; ensuring sufficient funding to ensure its future viability; safeguarding overall governance and integrity of the Institute; and proactively increasing the visibility and broadening of research collaborations with national and international agencies.

Prof Aung Tin
Executive Director

Prof Jodhbir Mehta
Deputy Executive Director

Prof Leopold Schmetterer
Scientific Director

Prof Ecosse Lamoureux
Director, Population Health

Assoc Prof Eranga Vithana
Director, Laboratory Translational Research

Assoc Prof Tina Wong
Director, Clinical Translational Research

Dr Vandana Ramachandran
Director, Administration,
Research Affairs & Support Services

Dr Danny Belkin
Director, Technology Development
& Commercialization

SERI's RESEARCH HEADS

The SERI Research Heads serves as a principle body actively engaged in the review and implementation of SERI's research policies and strategies. It further plays an integral role in conceptualizing SERI's research framework, in consultation with the SERI Senior Leadership, as the Institute moves onwards to face new challenges in its strive for continued research excellence.

Prof Aung Tin
Executive Director
Head, Glaucoma Research Group
Head, Clinical Research/Trials Research Platform

Prof Wong Tien Yin
Chairman

Prof Jodhbir Mehta
Deputy Executive Director
Head, Tissue Engineering & Stem Cell Research Group
Co-Head, Cornea & Refractive Reseach Group

Prof Leopold Schmetterer
Scientific Director
Head, Ocular Imaging Research Group

Prof Roger Beuerman
Senior Scientific Advisor

Adj Prof Donald Tan
Senior Scientific Advisor
Co-Head, Cornea & Refractive Research Group

Prof Eccosse Lamoureux
Director, Population Health
Head, Health Services Research Group & Data Management Unit

Assoc Prof Eranga Vithana
Director, Laboratory Translational Research
Head, Ocular Genetics Research Group, Experimental & Basic Sciences & Genomics Research Platform

Assoc Prof Tina Wong
Director, Clinical Translational Research
Head, Ocular Therapeutics & Drug Delivery Research Group

Dr Vandana Ramachandran
Director, Administration, Research Affairs & Support Services

Dr Danny Belkin
Director, Technology Development & Commercialization

Dr Baskaran Mani
Director, Research Clinic

Sis Peck Chye Fong
Deputy Director, Quality Risk & Education

Dr Seet Li Fong
Assistant Director, Laboratory Translational Research
Head, Experimental Molecular & Cell Biology Research Platform

SERI's RESEARCH HEADS (*continued*)

Prof Cheng Ching-Yu
Head, Ocular Epidemiology Research Group & Data Science Unit

Prof Chee Soon Phaik
Head, Cataract Research Group
Co-Head, Ocular Inflammation & Immunology Research Group

Prof Dan Milea
Head, Visual Neuroscience Research Group

Prof Louis Tong
Head, Ocular Surface Research Group
Co-Head, Ocular Inflammation & Immunology Research Group

Prof Saw Seang Mei
Co-Head, Myopia Reearch Group

Prof Jonathan Crowston
Clinician Scientist

Assoc Prof Gemmy Cheung
Head, Retina Research Group

Assoc Prof Lakshminarayanan Rajamani
Head, Anti-Infectives Reearch Group

Assoc Prof Audrey Chia
Co-Head, Myopia Reearch Group

Assoc Prof Shamira Perera
Co-Head, Bioengineering & Devices Research Group

Dr Michael Girard
Co-Head, Bioengineering & Devices Research Group

Dr Amutha Barathi
Head, Translational Pre-Clinical Model Research Platform

Dr Anita Chan
Head, Translational Ophthamic Pathology Research Platform

Dr Gary Yam
Head, Experimental Microscopy Research Platform

Dr Zhou Lei
Head, Proteomics Research Platform

SNEC's RESEARCH COMMITTEE

Terms of reference:

- Plays a pivotal role in the review of research budgets, as well as the evaluation and endorsement of the appropriateness of research projects, including the scientific merit of such projects.
- Oversight over the review/ approval of the SNEC HREF grants for research projects.
- Provides directions for the development of SERI's translational and clinical research capabilities.

Prof Aung Tin
Deputy Medical Director (Research), SNEC
Senior Consultant, Glaucoma Dept, SNEC

*Executive Director***,** SERI

Prof Jodhbir Mehta
Head & Senior Consultant,
Corneal & External Eye Disease Dept, SNEC

*Deputy Executive Director***,** SERI

Assoc Prof Tina Wong
Head & Senior Consultant, Glaucoma Dept, SNEC

Director, Clinical Translational Research, SERI

Prof Dan Milea
Senior Clinician, Neuro-Ophthalmology Dept, SNEC

Head, Visual Neuroscience Research Group, SERI

Prof Louis Tong
Senior Consultant, Corneal & External Eye Disease Dept, SNEC

Head, Ocular Surface Research Group, SERI
Co-Head, Ocular Inflammation & Immunology Research Group, SERI

Prof Jonathan Crowston
Senior Consultant, Glaucoma Dept, SNEC

Clinician Scientist, SERI

Assoc Prof Gemmy Cheung
Head & Senior Consultant, Medical Retina Dept, SNEC

Head, Retina Research Group, SERI

Assoc Prof Audrey Chia
Head & Senior Consultant,
Paediatric Ophthalmology & Strabismus Dept, SNEC

Co-Head, Myopia Research Group, SERI

Assoc Prof Shamira Perera
Senior Consultant, Glaucoma Dept, SNEC

Co-Head, Bioengineering & Devices Research Group, SERI

Adj Assoc Prof Lee Shu Yen
Deputy Head & Senior Consultant,
Surgical Retina Dept, SNEC

Adj Assoc Prof Sharon Tow
Senior Consultant,
Neuro-Ophthalmology Dept, SNEC

Dr Gavin Tan
Senior Consultant, Surgical Retina Dept, SNEC
Co-Head, Ocular Imaging Dept, SNEC

Clinician Scientist, SERI

TEACHING & TRAINING

SERI has been actively hosting research seminars, courses and talks which serve as a platform for information transfer and idea sharing, as well as networking conduit between the internal and external research communities. Besides serving as a fertile platform for the incubation of research ideas and generation of collaborative initiatives between the SERI faculty and external academics/ researchers, these activities further promote research-related talent development within SERI that is high value-added and knowledge-based.

The talks presented via these channels at SERI offer discourse on scientific ideas and discoveries in ophthalmology and vision research, as well as in other biomedical disciplines, including bioengineering, genomics, tissue engineering, stem cell therapy and therapeutics, etc.; blending clinical, epidemiological, translational and basic approaches within specific disciplines. These seminars have certainly led to the launch of many new projects and successful collaborative partnership between SERI and local as well as international academic/ research entities.

This initiative serves as an ideal teaching platform for our junior faculty, paving the way for immense synergies as they work together to tackle emerging challenges in the field of ophthalmology.

DATE	TOPIC	SPEAKER
17 July 2018	**Light Exposure and Myopia**	A/Prof Scott Read *Associate Professor and Director of Research in the School of Optometry and Vision Science at the Queensland University of Technology*
24 July 2018	**Patenting Software and AI Frameworks Under US Law**	Dr Andrew T. Serafini and Ms Candice C. Decaire *Partner, Kilpatrick Townsend & Stockton LLP*
29 Aug 2018	**Exploring Retinal Development and Disease with stem cells and animal models**	Dr Akishi Onishi *Laboratory for Retinal Regeneration, RIKEN Center for Biosystems Dynamics Research (RIKEN BDR)*
10 Dec 2018	**Incubation and VC Drive Innovation in Ophthalmology, from the Fast Growing Asia/China Market to Global Platform**	Ms Richel Liu *Founder and CEO of Rimonci Capital*
21 Feb 2019	**Engineering Approaches to Future Diagnoses and Treatments in Glaucoma**	Prof Ross Ethier Lawrence L. Gellerstedt, Jr. *Chair in Bioengineering, Georgia Research Alliance Eminent Scholar in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology & Emory University School of Medicine*
12 Mar 2019	**The New Frontier: Microinterventions In Ophthalmology**	Prof Sean Ianchulev *Professor of Ophthalmology at the Icahn School of Medicine at Mount Sinai and Director of Ophthalmic Innovation and Technology at New York Eye and Ear Infirmary of Mount Sinai*

13 Mar 2019	**Beyond P-values: Towards Robust and Elegant Statistics**	Dr Joses Ho *Research fellow in Adam Claridge-Chang's laboratory*
22 Mar 2019	**Bringing Closure to Glaucoma! From Greenland to China- clinical and Epidemiological Viewpoints on the Glaucoma Burden**	Prof Rupert Bourne *Professor of Ophthalmology at Anglia Ruskin University, Cambridge and Consultant Ophthalmic Surgeon at Cambridge University Hospital*
26 Mar 2019	**Cornea Tissue Engineering - Where Are We Now**	Prof Yun Feng *Executive committeeman of Chinese disability rehabilitation association, member of the corneal specialists on Beijing ophthalmologist society and the young member of Chinese women ophthalmologist society*

OUR COLLABORATIONS

Local Institutions

- Bioinformatics Institute (BII)
- Bioprocessing Technology Institute (BTI)
- Changi General Hospital Pte Ltd
- Duke-NUS Medical School
- Genome Institute of Singapore (GIS)
- Institute for Infocomm Research (I2R)
- Institute of High Performance Computing (IHPC)
- KK Women's And Children Hospital
- Nanyang Polytechnic
- Nanyang Technological University (NTU)
- National Dental Centre of Singapore Pte Ltd
- National Heart Centre of Singapore Pte Ltd
- National Healthcare Group Pte Ltd
- National Neuroscience Institute of Singapore (NNI)
- National University Hospital (Singapore) Pte Ltd
- National University of Singapore (NUS)
- Singapore Clinical Research Institute
- Singapore General Hospital Pte Ltd
- Singapore Health Services Pte Ltd
- Singapore Management University
- Singapore-MIT Alliciance for Research and Technology
- Singapore National Eye Centre
- Tan Tock Seng Hospital (TTSH)

Overseas Institutions (Academic)

- Asian Eye Institute, Inc
- Cardiff University
- Duke University
- Hyderabad Eye Research Foundation
- Imperial College London Diabetes Centre
- Johns Hopkins University
- King Khaled Eye Specialist Hospital (KKESH)
- LV Prasad Eye Institute
- Maastricht University
- Monash University
- Ningbo Institute of Materials Technology and Engineering
- Shinchon Severance Hospital
- The Chinese University of Hong Kong
- The First Affiliated Hospital of Kunming Medical University
- The Queen's University of Belfast
- The University Court of the University of Edinburgh
- The University of Newcastle
- University of Southern Denmark
- Vietnam National Institute of Ophthalmology (VNIO)
- Wenzhou Medical University
- Yonsei Medical Centre

Industry Collaborations

- Advanced Eye Centre
- Aier Eye Hospital Group Cop. Ltd
- Alcon Pte Ltd
- Allergan Singapore Pte Ltd
- ASAN Medical Center
- Astatine Ventures Pty Ltd
- Bayer (South East Asia) Pte Ltd
- Belle Healthcare Medical Technology Co. Ltd
- Biolight Life Sciences Ltd
- Boehringer Ingelheim International GmbH (BI)
- Boehringer Ingelheim Singapore Pte Ltd
- BSI Group Singapore
- CapaBio Pte Ltd
- Carl Zeiss Pte Ltd
- Chiltern International Pte. Ltd
- CLINREG Consulting Services
- Cylite Pte Ltd
- D.O.R.C. Dutch Ophthalmic Research Center (International) B.V.
- Experimental Biotherapeutics Centre
- Financiere De L'ombree (EOLANE)
- Gemini Therapeutics, Inc
- Geuder AG
- Gilead Sciences, Inc
- Gobiquity Inc
- Graybug Vision Inc
- Grey Innovation Pty Ltd
- Heidelberg Engineering GmbH
- Hogan Lovells US LLP
- HOYA Medical Singapore Pte Ltd
- INC Research LLC
- InnoVealth Pte Ltd
- Integrated Decision Systems Consultancy Pte Ltd
- Inteq Communications Pte Ltd
- Interactive Micro-organisms Laboratories Pte Ltd
- International Agency for the Prevention of Blindness (IAPB)
- Johnson and Johnson Vision Care, Inc.
- Kowa Company Ltd
- Lars Nelleman Consulting
- L'occitane Singapore Pte Ltd
- Leave a Nest Singapore Private Ltd
- Life Bridge Partners Pte Ltd
- Matrix Medical Consulting, Inc
- Medi Whale Inc.
- Menarini Biomarkers Singapore Pte Ltd
- MuPharma Pty Ltd
- Nidek Co., Ltd
- Novartis (Singapore) Pte Ltd
- NOXXON Pharma AG
- O.D. Ocular Discovery Ltd
- OliX Pharmaceuticals, Inc
- ONL Therapeutics, Inc.
- Optomed Oy
- Parexel International (Singapore) Pte Ltd
- Pharmaceutical Research Associates Singapore Pte Ltd
- Physio-Logic Ltd
- Pixium Vision
- Quark Pharmaceuticals, Inc.
- Roche Singapore Pte Ltd
- Samie Intellab Pte Ltd
- Sanofi- Aventis Singapore Pte Ltd
- Santen Pharmaceutical Asia Pte Ltd
- Santen Pharmaceutical Co. Ltd
- Seoul Semiconductor Co. Ltd
- SinSA Labs Inc
- Thesis Pte Ltd
- Topcon Corporation
- Ushio Asia Pacific Pte Ltd
- Verily Life Sciences LLC
- Yukti Bioscience Pte Ltd
- Zicom Medtacc Pte Ltd
- Zig Ventures Limited

EVENTS

INTERNATIONAL & LOCAL ACTIVITIES

SERI staff and associates participated actively in both overseas and local conferences during the year to establish links with overseas institutes, meet up with overseas collaborators and to promote and enhance SERI's presence in the international scene.

Conferences / meetings participated includes:

INTERNATIONAL ACTIVITIES		
TOPIC	**DATE**	**VENUE**
10th Annual RIMR Conference	4 - 6 Apr 2018	California, USA
2018 VZ Society Meeting	5 - 7 Apr 2018	Baltimore, USA
69th Annual Conference of Delhi Ophthalmological Society	6 - 8 Apr 2018	Delhi, India
4th Asia-Pacific Glaucoma Congress (APGC) 2018	13 - 15 Apr 2018	Busan, South Korea
ASCRS 2018 Annual Meeting on Cataract, IOL and Refractive Surgery	13 - 17 Apr 2018	Washington, USA
Royal Society of Medicine's Diabetic Retinopathy Screening Day	20 Apr 2018	London, UK
Vietnam Glaucoma Club	21 Apr 2018	Hue, Vietnam
Guangzhou Glaucoma Forum (GZGF)	21 - 22 Apr 2018	Guangzhou, China
Saudi Ophthalmology 2018	21 - 23 Apr 2018	Riyadh, Saudi Arabia
21st Annual International Ocular Surface Society Conference (IOSS 2018)	28 Apr 2018	Honolulu, USA
The 7th LIME international meeting	29 Apr 2018	Honolulu, USA
Association for Research in Vision and Ophthalmology (ARVO) 2018	29 Apr - 3 May 2018	Honolulu, USA
23rd International Visual Field & Imaging Symposium	9 - 12 May 2018	Kanazawa, Japan
Queen's University Rosen Day Symposium	11 May 2018	Kingston, Canada
Asia Cornea Society (ACS 2018)	17 - 20 May 2018	Qingdao, China
6th Asia Cornea Society Biennial meeting	17 - 20 May 2018	Qingdao, China
13th European Glaucoma Society Congress	19 - 22 May 2018	Florence, Italy
RCOphth Annual Congress 2018	21 - 24 May 2018	London, United Kingdom
IX International Conference on Ophthalmology East-West	7 - 8 Jun 2018	Ufa, Russia
36th World Glaucoma Congress (WOC) of the International Council of Ophthalmology	16 - 19 Jun 2018	Barcelona, Spain
ICO-ARVO Symposium, World Ophthalmology Congress	18 Jun 2018	Barcelona, Spain
The International Congress of the Italian Society of Stem Cells and Ocular Surface, XVII S.I.C.S.S.O Congress 2018	21 - 23 Jun 2018	Salerno, Italy
7th Annual World Congress of Infectious Diseases (WCID 2018)	12 - 14 Jul 2018	Bangkok, Thailand
Glaucoma Summit 2018	14 Jul 2018	Kunming, China
31st Annual Meeting of the Asia-Pacific Association of Cataract & Refractive Surgeons	19 - 21 Jul 2018	Chiang Mai, Thailand
Beyond Conference	20 - 22 Jul 2018	Sydney, Australia
OSKON (ocular surface and keratoprosthesis) 2018 conference	27 - 29 Jul 2018	Chennai, India
RANZCO Queensland Branch Annual Scientific Meeting	3 - 4 Aug 2018	Gold Coast, Australia
66th Tamilnadu Ophthalmic Association Annual Conference	10 - 12 Aug 2018	Chennai, India

INTERNATIONAL ACTIVITIES		
TOPIC	**DATE**	**VENUE**
Japan Macula Club	18 - 19 Aug 2018	Aichi, Japan
Indo-China Ocular Inflammation/Infection Meeting	19 - 21 Aug 2018	Mongolia, China
Shanghai Ophthalmology Gong Ji Forum 2018	23 - 25 Aug 2018	Shanghai, China
Glaucoma Research Society Meeting 2018	29 Aug - 1 Sep 2018	Parma, Italy
18th European Vitreo Retinal Society Meeting	30 Aug - 2 Sep 2018	Prague, Czech Republic
5th TERMIS World Congress 2018	4 - 7 Sep 2018	Kyoto, Japan
27th Annual Congress of the College of Ophthalmologist of Sri Lanka	5 - 9 Sep 2018	Sri Lanka, Sri Lanka
9th International Congress on Glaucoma Surgery	6 - 8 Sep 2018	Montreal, Canada
XXII Biennial Meeting of the International Society for Eye Research (ISER)	11 - 13 Sep 2018	Belfast, United Kingdom
23rd Congress of Chinese Ophthalmological Society (CCOS)	12 - 16 Sep 2018	Hangzhou, China
IAPB Council of Members Meeting 2018	13 - 16 Sep 2018	Hyderabad, India
Glaucoma Society of India Annual Conference	14 - 16 Sep 2018	Trivandrum, India
Ophthalmology Futures Forum (OF) 2018	20 Sep 2018	Vienna, Austria
18th EURETINA Congress	20 - 23 Sep 2018	Vienna, Austria
9th EuCornea Congress	21 - 22 Sep 2018	Vienna, Austria
36th Congress of the ESCRS	22 - 26 Sep 2018	Vienna, Austria
European Association for Vision and Eye Research (EVER) Congress	4 - 6 Oct 2018	Nice, France
European Association for the Study of Diabetes e.V. (EASD)	1 - 5 Oct 2018	Berlin, Germany
First Congress of Chinese Society of Public Health Ophthalmology	12 Oct 2018	Beijing, China
ASN Kidney Week	23 - 28 Oct 2018	San Diego, USA
Ophthalmology Innovation Summit (OIS)	25 Oct 2018	Chicago, USA
International Society of Refractive Surgery (ISRS) Subspecialty Day	26 Oct 2018	Chicago, USA
American Academy of Ophthalmology 2018	27 - 30 Oct 2018	Chicago, USA
120th Annual Meeting of the Korean Ophthalmological Society	2 - 4 Nov 2018	Seoul, South Korea
Vietnam National Congress of Ophthalmology 2018	8 - 10 Nov 2018	Ho Chi Minh, Vietnam
Europe-Asia Pathologic Myopia Meeting	16 Nov 2018	Paris, France
Asia Dry Eye Summit 2018	16 - 17 Nov 2018	Seoul, South Korea
59th annual meeting of the Ophthalmological Society of Taiwan	17 - 18 Nov 2018	Taipei, Taiwan
ESASO 2018 Bangkok	23 - 27 Nov 2018	Bangkok, Thailand
Young Ophthalmologist Symposium	25 Nov 2018	New Delhi, India
6th Annual Meeting of Cornea Society of India, Keracon 2018	30 Nov - 2 Dec 2018	New Delhi, India
Artificial Intelligence for Retinal Image Analysis (AIRIA 2018)	2 Dec 2018	Perth, Australia
2018 Asian Conference on Computer Vision (ACCV)	4 - 6 Dec 2018	Seoul, South Korea
ISGS Advanced Surgical Wetlab Course	8 - 9 Dec 2018	Geneva, Switzerland
12th APVRS Congress	14 - 16 Dec 2018	Seoul, South Korea
7th Zermatt Winter Meeting	24 - 27 Jan 2019	Zermatt, Switzerland
4th International Stevens-Johnson Syndrome Symposium	26 - 27 Jan 2019	Kyoto, Japan
Photonics West, BiOS	2 - 7 Feb 2019	San Francisco, USA
Macula Society 42nd Annual Meeting	13 - 18 Feb 2019	Florida, USA
Conference on Frailty & Sarcopenia Research (ICFSR2019)	20 - 22 Feb 2019	Miami, USA

INTERNATIONAL ACTIVITIES		
TOPIC	**DATE**	**VENUE**
34th Asia Pacific Academy of Ophthalmology Congress (APAO)	6 - 9 Mar 2019	Bangkok, Thailand
Finnish Ophthalmology Society Conference	13 - 17 Mar 2019	Lahti, Finland
45th Annual Meeting NANOS 2019	16 - 21 Mar 2019	Las Vegas, USA
International Conference on Surgical Education and Training	21 - 22 Mar 2019	Edinburgh, Scotland
National Congress of the Romanian Society of Glaucoma	21 - 24 Mar 2019	Poiana Brasov, Romania
Retina World Congress 2019	21 - 25 Mar 2019	Florida, USA
8th World Glaucoma Congress	27 - 30 Mar 2019	Melbourne, Australia
LOCAL ACTIVITIES		
TOPIC	**DATE**	**VENUE**
AISG-SingHealth-NUS AI in Medicine Symposium (AIMS) – Towards SmartHealth	5 Apr 2018	Singapore
NMRC Awards Ceremony and Research Symposium 2018	17 - 18 Apr 2018	Singapore
SNEC-Beijing Tongren Summit	6 Jul 2018	Singapore
3rd Asia Pacific Tele-Ophthalmology Society Symposium	7 - 8 Jul 2018	Singapore
Asian Scientist Magazine Symposium	21 Jul 2018	Singapore
ESASO 2018	22 - 26 Aug 2018	Singapore
5th SingHealth Duke-NUS Scientific Congress	21 - 22 Sep 2018	Singapore
13th Singapore Public Health & Occupational Medicine Conference	4 - 5 Oct 2018	Singapore
NHG Eye Institute 8th International Ophthalmology Congress (IOC)	5 - 6 Oct 2018	Singapore
IARU Ageing, Longevity and Health - New Frontiers and Perspectives	17 Oct 2018	Singapore
1st International Biomechanics & Clinical Tissue Engineering Symposium (IBACTES 2018)	23 - 24 Oct 2018	Singapore
Singapore Association for Laboratory Animal Science (SALAS) 2018 conference	8 - 9 Nov 2018	Singapore
Cell Symposia: Single Cell 2019	24 - 26 Feb 2019	Singapore

Gala Fund-Raising Dinner, The EYE Ball 2018

THE EYE BALL 2018 was absolutely “Candylicious”!

Guests came in colourful outfits for the candy-themed annual charity gala at The Ritz-Carlton on 17 November 2018 to raise funds for VisionSave, a joint SNEC and SERI campaign in aid of vision loss prevention, so that SNEC/ SERI can continue in our strive to initiate positive life-changing outcomes for our patients.

The grand event kicked off with the thundering Taiko drums by the Japanese Association of Singapore and followed with a welcome speech by Adj Assoc Prof Ho Ching Lin, Chairman of THE EYE BALL 2018.

Highlights of the night includes the Visionary Award presentation to Prof Soo Khee Chee for his stellar achievements in the healthcare community; entertainment with performances by Jack and Rai along with lovely host, Nikki Muller, and an exquisite curated dinner by The Ritz-Carlton’s Executive Chef, Massimo Pasquarelli.

The excitement heated up with the live auction by Helping Hand Group, where guests bid for luxurious stays in Phuket, Maldives and South Africa, premium services and more. A total net fund of approximately more than S$1.2 Million was raised. The event ended with guests dancing the night away!

ACHIEVEMENTS

OUR AWARDS

Local Awards

- **Health Manpower Development Plan (HMDP) Award** [Mar 2019]
  "Glaucoma and Advanced Anterior Segment Surgery (GAASS)"
  Dr Yap Zhu Li

- **SingHealth Health Quality Service Award 2019 : Star Award** [Jan 2019]
  Assoc Prof Ian Yeo

- **SingHealth Health Quality Service Award 2019 : Star Award** [Jan 2019]
  Assoc Prof Marcus Ang

- **SingHealth Health Quality Service Award 2019 : Star Award** [Jan 2019]
  Dr Boey Pui Yi

- **SingHealth Health Quality Service Award 2019 : Gold Award** [Jan 2019]
  Adj Assoc Prof Doric Wong

- **SingHealth Health Quality Service Award 2019 : Gold Award** [Jan 2019]
  Adj Assoc Prof Mohamad Rosman

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Prof Chee Soon Phaik

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Rajana Mathur

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Anshu Arundhati

- **Health Manpower Development Plan (HMDP) Award** [Mar 2019]
  "Periocular Skin Cancer Management, Periocular Reconstruction, Paediatric Oculoplastics and Orbital Tumors"
  Dr Yong Kailing

- **SingHealth Health Quality Service Award 2019 : Star Award** [Jan 2019]
  Assoc Prof Shamira Perera

- **SingHealth Health Quality Service Award 2019 : Star Award** [Jan 2019]
  Dr Khor Wei Boon

- **SingHealth Health Quality Service Award 2019 : Gold Award** [Jan 2019]
  Dr Sunny Shen

- **SingHealth Health Quality Service Award 2019 : Gold Award** [Jan 2019]
  Adj Assoc Prof Audrey Looi

- **SingHealth Health Quality Service Award 2019 : Gold Award** [Jan 2019]
  Dr Melissa Wong

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Adj Assoc Prof Rahat Husain

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Wang Jenn Chyuan

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Anita Chan

- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Annabel Chew
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Jean Chai
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Prof Dan Milea
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Anna Tan
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Daniel Chua
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Jayant V Iyer
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Deborah Tan
- **SingHealth Health Quality Service Award 2019 : Silver Award** [Jan 2019]
  Dr Olivia Huang
- **Eye and Vision Health Award 2018 : Visionary Award** [Dec 2018]
  Prof Aung Tin
- **SingHealth Publish! Award 2018** [Oct 2018]
  Dr Daniel Ting
- **SingHealth Publish! Award 2018** [Oct 2018]
  Dr Chetna Dhand
- **SingHealth Duke-NUS Scientific Congress 2018: Best Poster Award** [Sep 2018]
  Dr Preeti Gupta
- **Singapore Manufacturing Federation Award 2018** [Sep 2018]
  Dr Livia Teo
- **Singapore Manufacturing Federation Award 2018** [Sep 2018]
  Adj Assoc Prof Seah Lay Leng
- **National Day Awards 2018: Long Service Medal** [Aug 2018]
  Dr Ti Seng Ei
- **National Day Awards 2018: Long Service Medal** [Aug 2018]
  Adj Assoc Prof Sharon Tow
- **National Day Awards 2018: Long Service Medal** [Aug 2018]
  Assoc Prof Edmund Wong
- **National Day Awards 2018: Long Service Medal** [Aug 2018]
  Assoc Prof Ian Yeo
- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Faculty Appreciation Award** [Aug 2018]
  Assoc Prof Audrey Chia
- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Faculty Award** [Aug 2018]
  Assoc Prof Tina Wong
- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Faculty Award** [Aug 2018]
  Assoc Prof Shamira Perera
- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Faculty Award** [Aug 2018]
  Dr Melissa Wong

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Resident Award** [Aug 2018]
  Dr Nicole Sie Ming

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Resident Award** [Aug 2018]
  Dr Ng Si Rui

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Inspiring Resident-Educator Award** [Aug 2018]
  Dr Olivia Huang

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Partners in Education** [Aug 2018]
  Ms Zainorah Alias

- **Singapore National Academy of Science (SNAS) Fellowships: Fellow of the Singapore National Academy of Science** [May 2018]
  Prof Wong Tien Yin

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Resident Award** [Aug 2018]
  Dr Nathalie Chiam

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Outstanding Resident Award** [Aug 2018]
  Dr Olivia Huang

- **RiSE (Residency in SingHealth Excels) Awards Ceremony: Residents Committee Appreciation Award** [Aug 2018]
  Dr Reuben Foo

- **SingHealth Excellence Awards 2018: Distinguished Young Researcher Award [May 2018]**
  Dr Daniel Ting

- **SingHealth Duke-NUS Kwan Im Thong Hood Cho Temple Professorship in Ophthalmology** [May 2018]
  Prof Aung Tin

International Awards

- **The Singapore Association for Laboratory Animal Science (SALAS): Japan Association for Laboratory Animal Science International Award (JALAS)** [Mar 2019]
  Dr Sai Bo Bo Tun

- **Asia-Pacific Academy of Ophthalmology (APAO): Distinguished Service Award 2019** [Mar 2019]
  Prof Dan Milea

- **Asia-Pacific Academy of Ophthalmology 2019: Fellow of AAPPO (Academy of Asia-Pacific Professors of Ophthalmology)** [Mar 2019]
  Prof Ecosse Lamoureux

- **Asia-Pacific Academy of Ophthalmology 2019: Fellow of AAPPO (Academy of Asia-Pacific Professors of Ophthalmology)** [Mar 2019]
  Prof Saw Seang Mei

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Prof Louis Tong

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Adj Assoc Prof Quah Boon Long

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Dr Anita Chan

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Dr Gavin Tan

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Dr Gary Yam

- **Asia-Pacific Academy of Ophthalmology (APAO): Jose Rizal Medal 2019** [Mar 2019] –
  Jose Rizal Medal Lecture: The War on Diabetic Retinopathy: Where are we now?
  Prof Wong Tien Yin

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Outstanding Service in Prevention of Blindness Award 2019** [Mar 2019]
  Assoc Prof Marcus Ang

- **Asia-Pacific Academy of Ophthalmology 2019: Fellow of AAPPO (Academy of Asia-Pacific Professors of Ophthalmology)** [Mar 2019]
  Prof Cheng Ching-Yu

- **Asia-Pacific Academy of Ophthalmology 2019: Fellow of AAPPO (Academy of Asia-Pacific Professors of Ophthalmology)** [Mar 2019]
  Prof Louis Tong

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Adj Assoc Prof Rahat Husain

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Adj Assoc Prof Mohamad Rosman

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Dr Liu Yu-Chi

- **Asia-Pacific Academy of Ophthalmology (APAO): APAO Achievement Award 2019** [Mar 2019]
  Dr Daniel Ting

- **Asia-Pacific Academy of Ophthalmology (APAO): Best Scientific Paper Award** [Mar 2019]
  "Prevalence, Risk Factors and Vision Association with OCT Diagnosed Epiretinal Membrane in the SEED Cohort"
  Dr Kelvin Teo

- **Asia-Pacific Academy of Ophthalmology (APAO): Best Scientific Paper Award** [Mar 2019]
  "Quantification of Endothelial Cell Loss with a Pull-Through Inserter for Descemet's Membrane Endothelial Keratoplasty."
  Dr Tan Tien En

- **Macula Society: Evangelos Gragoudas Award** [Feb 2019]
  Dr Daniel Ting

- **Philippine Glaucoma Society : Manuel B. Agulto Award** [Dec 2018]
  Prof Aung Tin

- **American Academy of Ophthalmology (AAO): AAO Achievement Award** [Oct 2018]
  Dr Anshu Arundhati

- **World Ophthalmology Congress: Cataract Olympics Freestyle - Gold Medal** [Jun 2018]
  Prof Chee Soon Phaik

- **Asia-Pacific Academy of Ophthalmology (APAO): Best Scientific Paper Award** [Mar 2019]
  "Anti-Vascular Endothelial Growth Factor A/ Anti-Angiopoietin-2 Bispecific Antibody Facrimad in Diabetic Macular Edema: Efficacy and Safety Results From the Phase 2 BOULEVARD Randomized Clinical Trial"
  Assoc Prof Gemmy Cheung

- **Asia-Pacific Academy of Ophthalmology (APAO): Best Scientific Paper Award** [Mar 2019]
  "FitSight watch: a novel approach to measure outdoor light patterns in 7 year old Singapore children."
  Dr Carla Lanca

- **12th Asia-Pacific Vitreo-retina Society (APVRS) Congress: APVRS Constable Lecture 2018** [Dec 2018]
  Assoc Prof Gemmy Cheung

- **American Academy of Ophthalmology (AAO): Senior Achievement Award** [Oct 2018]
  Prof Chee Soon Phaik

- **European Society of Retina Specialists (EURETINA): Euretina Lecture** [Sep 2018]
  Prof Wong Tien Yin

- **American Society of Cataract and Refractive Surgery (ASCRS): Cataract Olympics - Silver and Gold Medal** [Apr 2018]
  Prof Chee Soon Phaik

OUR GRANTS

NMRC

- **"Optimising the Assessment of Quality of Life in Glaucoma Using Item Bank and Computer Adaptive Testing Systems".**
  Dr Eva Harper; S$748,525.00

- **"Application and Evaluation of an Artificial Intelligence Deep Learning System to Detect Referable and Sight-threatening Retinal Diseases in the Singapore Integrated Diabetic Retinopathy Screening Programme (SiDRP): Screening Performance and Cost-effectiveness Analysis".**
  Dr Daniel Ting; S$1,138,261.00

- **"TAAP: Translational Asian Age-related macular degeneration Program".**
  Assoc Prof Gemmy Cheung; S$20,077,477.92

- **"The Singapore Epidemiology of Eye Diseases (SEED) Study 3: Prospective multi-ethnic cohort study of 12-year incidence, risk factors, and impact of major age-related eye diseases"**
  Prof Cheng Ching-Yu; S$1,500,000.00

- **"An Intensive, Practical, and Personalized Care Planning to Improve Glycemic Control, Clinical, Ocular, And Patient Centred Outcomes in Poorly Controlled Patients with Diabetic Retinopathy"**
  Prof Ecosse Lamoureux; S$1,388,902.07

- **"The application of Terahertz scanning system on the evaluation of corneal opacities"**
  Dr Liu Yu-Chi; S$336,250.00

A*Star/ Duke-NUS/ MOH/ Others

- **"Preclinical Evaluation of Antimicrobial Dressings in Psuedomonas Aeruginosa Infected Burns Wounds".**
  Assoc Prof Lakshminarayanan Rajamani; S$150,000.00

- **"Light and outdoor patterns for the prevention of myopia (Sunflower Project)".**
  Prof Saw Seang Mei; S$1,465,833.33

- **"Non-leachable Antimicrobial Electrospun Nanofibre Mats for the Treatment of Topical Infections".**
  Assoc Prof Lakshminarayanan Rajamani; S$208,333.00

- **"In Vivo Evaluation of the Safety, Biointegration, and Retention of Modified Corneal Prosthetic Device in Rabbits"**
  Dr Andri Kartasasmita Riau; S$150,000.00

- **"Scleral Biomechanical Properties in Pathologic Myopia and Myopic Glaucoma"**
  Dr Donny Hoang; S$149,989.00

- **"Quantification of Retinal and Choroidal Microvascular Parameters Using Wide-field Optical Coherence Tomographic Angiography in Patients with Systemic Hypertension"**
  Dr Jacqueline Chua; S$40,000.00

- **"Subconjunctival Liposomal Prednisolone Phosphate for Post Cataract Surgery"**
  Assoc Prof Tina Wong; S$208,333.40

- **"Efficacy and Safety of ε-Polylysine as a Potent Ophthalmic Antifungal for Clinical Development"**
  Assoc Prof Lakshminarayanan Rajamani;
  S$208,289.00

SingHealth

- **"Development of a Novel Descemet Membrane Endothelial Keratoplasty Surgical Device".**
  Assoc Prof Marcus Ang; S$100,000.00

- **"Evaluation of safety and device retention of modified keratoprosthesis in animal model".**
  Dr Andri Kartasasmita Riau; S$150,000.00

- **"Clinical and Cost-effectiveness Analysis on Artificial Intelligence using Deep Learning System for Diabetic Retinopathy Screening".**
  Dr Daniel Ting; S$128,000.00

- **"Evaluating atorvastatin loaded solid lipid nanoparticulate formulation for its purported use in the management of Age Related Macular Degeneration using a suitable animal model".**
  Dr Amutha Barathi Veluchamy; S$73,823.53

- **"Investigating the In vivo Safety and Efficacy of Cell-selective Pore-forming Peptides".**
  Assoc Prof Lakshminarayanan Rajamani; S$149,563.00

- **"Investigating Signal Transduction Pathways in Conjunctival Fibrosis: Therapeutic Potential of Novel Selective Inhibition".**
  Dr Ong Hon Shing; S$50,000.00

Commercial

- **"Prospective Evaluation of a Smartphone Application, GoCheckKids™, as a Photo Screening Tool".**
  Assoc Prof Audrey Chia; S$74,784.37

- **"Invivo study to establish PK and PD parameters of B2088"**
  Prof Roger Beuerman; S$103,530.74

- **"Natural History of Rhegmatogenous Retinal Detachment Involving the Macula in Asians: the LUNAR Extension Study"**
  Dr Cheung Ning; S$149,486.19

- **"A Prospective Controlled Clinical Study to Evaluate the Safety and Performance of the HOYA Surgical Optics VIVINEX® GEMETRIC™ Preloaded Intraocular Lens"**
  Prof Chee Soon Phaik; S$179,696.99

- **"Determination of the Ocular Tissue Distribution of Test Article After a Repeated Topical Ocular Dose Regimen in Cynomolgus Monkeys"**
  Dr Amutha Barathi Veluchamy; S$171,486.90

- **"Assessment of various dyes on cultured primary human corneal endothelial cells"**
  Prof Jodhbir Mehta; S$11,128.00

- **"A Phase III, Multicenter, Randomized, Double-masked, Active Comparator controlled Study to Evaluate the Efficacy and Safety of RO6867461 in Patients with Diabetic Macular Edema (RHINE)"**
  Dr Gavin Tan; S$242,913.98

- **"A Phase III, Multicenter, Randomized, Double-masked, Active Comparator-Controlled Study to Evaluate the Efficacy and Safety of Faricimab in Patients with Neovascular Age-Related Macular Degeneration (Lucerne)"**
  Assoc Prof Gemmy Cheung; S$281,164.60

OUR PUBLICATIONS

- Mu Yue, Jialiang Li, Ming-Yen Cheng. **Two-step sparse boosting for high-dimensional longitudinal data with varying coefficients.** *Computational Statistics & Data Analysis.* 2019 Mar;131(1):222-234

- Wang LZ, Syn N, Li S, Barathi VA, Tong L, Neo J, Beuerman RW, Zhou L. **The penetration and distribution of topical atropine in animal ocular tissues.** *Acta Ophthalmol.* 2019 Mar;97(2):e238-e247. doi: 10.1111/aos.13889.

- Chua J, Chin CWL, Hong J, Chee ML, Le TT, Ting DSW, Wong TY, Schmetterer L. **Impact of hypertension on retinal capillary microvasculature using optical coherence tomographic angiography.** *J Hypertens.* 2019 Mar;37(3):572-580. doi: 10.1097/HJH.0000000000001916.

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FINANCIAL REPORT

Directors' statement

We are pleased to submit this annual report to the member of the Company together with the audited financial statements for the financial year ended 31 March 2019.

In our opinion:

(a) the financial statements set out on pages FS1 to FS32 are drawn up so as to give a true and fair view of the financial position of the Company as at 31 March 2019 and the financial performance and cash flows of the Company for the year ended on that date in accordance with the provisions of the Singapore Companies Act, Chapter 50, the Singapore Charities Act, Chapter 37 and other relevant regulations and Financial Reporting Standards in Singapore; and

(b) at the date of this statement, having regard to the financial support from the immediate holding company, there are reasonable grounds to believe that the Company will be able to pay its debts as and when they fall due.

The Board of Directors has, on the date of this statement, authorised these financial statements for issue.

Directors

The directors (who are also the charity trustees) in office at the date of this statement are as follows:

Professor Wong Tien Yin	
Ms Ooi Chee Kar	
Professor Ang Chong Lye	
Professor Wang Linfa	
Professor Soo Khee Chee	
Doctor Geh Min	
Professor Lim Tock Han	
Professor James D Best	
Professor Thomas M Coffman	
A/Prof Vernon Lee Jian Ming	(Appointed on 15 November 2018)
Professor Chong Yap Seng	(Appointed on 1 January 2019)
Professor Tan Sze Wee	(Appointed on 1 August 2019)

Directors' Interests

The Company has no share capital and its members' liability is limited by guarantee.

Neither at the end of, nor at any time during the financial year, was the Company a party to any arrangement whose objects are, or one of whose objects is, to enable the directors of the Company to acquire benefits by means of the acquisition of shares in or debentures of the Company or any other body corporate.

Share options

The Company does not have any share capital and accordingly has not issued any share options.

Auditors

The retiring auditors, KPMG LLP, will not be seeking re-appointment at the forthcoming Annual General Meeting. Ernst & Young LLP has expressed their willingness to accept appointment as auditors.

On behalf of the Board of Directors

Professor Wong Tien Yin
Director

Ms Ooi Chee Kar
Director

INDEPENDENT AUDITORS' REPORT

Member of the Company
Singapore Eye Research Institute

Report on the audit of the financial statements

Opinion

We have audited the financial statements of Singapore Eye Research Institute ('the Company'), which comprise the balance sheet as at 31 March 2019, the statement of comprehensive income and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies, as set out on pages FS1 to FS32.

In our opinion, the accompanying financial statements are properly drawn up in accordance with the provisions of the Companies Act, Chapter 50 ('the Companies Act'), the Charities Act, Chapter 37 and other relevant regulations ('the Charities Act and Regulations'), and Financial Reporting Standards in Singapore ('FRSs') so as to give a true and fair view of the financial position of the Company as at 31 March 2019 and of the financial performance and cash flows of the Company for the year ended on that date.

Basis for opinion

We conducted our audit in accordance with Singapore Standards on Auditing ('SSAs'). Our responsibilities under those standards are further described in the '*Auditors' responsibilities for the audit of the financial statements*' section of our report. We are independent of the Company in accordance with the Accounting and Corporate Regulatory Authority *Code of Professional Conduct and Ethics for Public Accountants and Accounting Entities* ('ACRA Code') together with the ethical requirements that are relevant to our audit of the financial statements in Singapore, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ACRA Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other information

Management is responsible for the other information contained in the annual report. Other information is defined as all information in the annual report other than the financial statements and our auditors' report thereon.

We have obtained all other information prior to the date of this auditors' report.

Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of management and those charged with governance for the financial statements

Management is responsible for the preparation of financial statements that give a true and fair view in accordance with the provisions of the Companies Act, the Charities Act and Regulations and FRSs, and for devising and maintaining a system of internal accounting controls sufficient to provide a reasonable assurance that assets are safeguarded against loss from unauthorised use or disposition; and transactions are properly authorised and that they are recorded as necessary to permit the preparation of true and fair financial statements and to maintain accountability of assets.

In preparing the financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance comprises the directors. Their responsibilities include overseeing the Company's financial reporting process.

Auditors' responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with SSAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal controls.

- Obtain an understanding of internal controls relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal controls.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal controls that we identify during our audit.

Report on other legal and regulatory requirements

In our opinion, the accounting and other records required to be kept by the Company have been properly kept in accordance with the provisions of the Companies Act, and the Charities Act and Regulations.

During the course of our audit, nothing has come to our attention that causes us to believe that during the year:

(a) the
(b) the Company has not complied with the requirements of Regulation 15 of the Charities (Institutions of a Public Character) Regulations.

KPMG LLP
Public Accountants and
Chartered Accountants

Singapore

FINANCIAL STATEMENTS

Balance sheet
As at 31 March 2019

	Note	2019 $	2018 $
Assets			
Property, plant and equipment	4	5,805,066	6,378,299
Intangible assets	5	67,273	162,418
		5,872,339	6,540,717
Non-current assets			
Trade and other receivables	6	20,080,126	15,977,543
Prepayments		301,687	56,375
Cash and cash equivalents	8	9,644,088	10,117,110
Current assets		30,025,901	26,151,028
Total assets		35,898,240	32,691,745
Accumulated fund	9	(650,359)	(546,878)
Non-current liability			
Deferred income	10	3,693,492	4,451,576
		3,693,492	4,451,576
Current liabilities			
Trade payables	11	8,517,186	6,218,883
Other payables	12	21,998,924	19,879,954
Deferred income	10	1,616,943	1,952,790
Employee benefits	13	722,054	735,420
		32,855,107	28,787,047
Total liabilities		36,548,599	33,238,623
Total accumulated fund and liabilities		35,898,240	32,691,745

Statement of comprehensive income
Year ended 31 March 2019

	Note	2019 $	2018 $
Operating expenditure grants	14	28,519,272	25,276,731
Amortisation of deferred income	10	1,535,058	1,708,451
Government subvention	17	543,463	1,747,274
Other income	15	3,090,285	4,300,996
		33,688,078	33,033,452
Staff costs		(16,594,416)	(17,437,165)
Supplies and consumables		(3,492,867)	(4,085,463)
Depreciation of property, plant and equipment	4	(1,481,665)	(1,599,016)
Amortisation of intangible assets	5	(125,034)	(248,623)
Rental and utilities		(2,915,745)	(2,696,268)
Purchased and contracted services		(6,802,770)	(5,683,486)
Repairs and maintenance		(527,127)	(1,170,695)
Reversal of impairment loss on trade and other receivables		26,894	–
Other operating expenses		(1,780,265)	(1,841,508)
Deficit from operating activities		(4,917)	(1,728,772)
Finance income/(costs)	16	8,098	(2,606)
Surplus/(Deficit) before tax		3,181	(1,731,378)
Tax expense	18	–	–
Surplus/(Deficit) for the year	19	3,181	(1,731,378)
Other comprehensive income for the year, net of tax		–	–
Total comprehensive income for the year		3,181	(1,731,378)
Accumulated fund brought forward		(546,878)	1,184,500
Adjustment on initial application of FRS 109, net of tax (note 2.6)		(106,662)	–
Accumulated fund carried forward		(650,359)	(546,878)

The Company had no other changes in accumulated fund except for surplus for the year of $3,181 (2018: deficit of $1,731,378) for the financial year ended 31 March 2019.

Statement of cash flows
Year ended 31 March 2019

	Note	2019	2018
		$	$
Cash flows from operating activities			
Surplus/(Deficit) for the year		3,181	(1,731,378)
Adjustments for:			
Depreciation of property, plant and equipment	4	1,481,665	1,599,016
Loss on disposal of property, plant and equipment	19	–	16,938
Amortisation of intangible assets	5	125,034	248,623
Reversal of impairment loss on trade and other receivables		(26,894)	–
Amortisation of deferred income	10	(1,535,058)	(1,708,451)
		47,928	(1,575,252)
Changes in working capital:			
Trade and other receivables		(4,182,351)	(641,301)
Prepayments		(245,312)	(4,519)
Trade and other payables		4,417,273	5,467,727
Employee benefits		(13,366)	(580)
Net cash from operating activities		24,172	3,246,075
Cash flows from investing activities			
Purchase of property, plant and equipment		(1,252,788)	(2,053,189)
Purchase of intangible assets		(29,889)	(18,127)
Proceeds from disposal of property, plant and equipment		–	21,400
Grants for capital expenditure		785,483	2,012,373
Net cash used in investing activities		(497,194)	(37,543)
Net (decrease)/increase in cash and cash equivalents		(473,022)	3,208,532
Cash and cash equivalents at beginning of the year		10,117,110	6,908,578
Cash and cash equivalents at end of the year	8	9,644,088	10,117,110

During the year, the Company acquired property, plant and equipment and intangible assets with an aggregate cost of $1,282,677 (2018: $2,071,316), of which $785,483 (2018: $2,012,373) was acquired using grants received.

NOTES TO THE FINANCIAL STATEMENTS

These notes form an integral part of the financial statements.

The financial statements were authorised for issue by the Board of Directors on

1. Domicile and activities

Singapore Eye Research Institute (the Company) is incorporated in the Republic of Singapore. The address of the Company's registered office is 31 Third Hospital Avenue, #03-03 Bowyer Block, Singapore 168753.

The principal activities of the Company are to carry out eye-related medical research projects.

The immediate, intermediate holding companies and ultimate holding party during the financial year are Singapore National Eye Centre Pte Ltd, Singapore Health Services Pte Ltd and MOH Holdings Pte Ltd, and Minister for Finance respectively. These companies were incorporated in the Republic of Singapore.

The Company, limited by guarantee, has been registered as a Charity, under the Charities Act, Cap. 37 with effect from 27 November 2002.

2. Basis of preparation

2.1 Going Concern

As at 31 December 2018, the Company had deficiencies in accumulated fund and net working capital of $650,359 and $2,829,206 respectively. Notwithstanding this, the directors of the Company consider that it is appropriate for the Company to prepare its financial statements on a going concern basis as the immediate holding company has agreed to provide financial support as is necessary for the next twelve months to enable the Company to continue its operations and to meet its liabilities as and when they fall due.

2.2 Statement of compliance

The financial statements have been prepared in accordance with the Financial Reporting Standards in Singapore ('FRS')

This is the first set of the Company's annual financial statements in which FRS 109 *Financial Instruments* has been applied. Changes to significant accounting policies are disclosed in note 2.6.

2.3 Basis of measurement

The financial statements have been prepared on the historical cost basis except as otherwise described in the notes below.

2.4 Functional and presentation currency

The financial statements are presented in Singapore dollars, which is the Company's functional currency.

2.5 Use of estimates and judgements

The preparation of the financial statements in conformity with FRSs requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimates are revised and in any future periods affected.

Information about assumptions and estimation uncertainties that have a significant risk of resulting in a material adjustment within the next financial year are included in the following note:

- Note 20 – measurement of expected credit losses ('ECLs') allowance for trade and other receivables: key assumptions in determining the weighted-average loss rate.

2.6 Adoption of new standards

The Company has applied the following FRS and interpretation of FRS for the first time for the annual period beginning on 1 April 2019:

- FRS 109 *Financial Instruments*; and
- INT FRS 122 *Foreign Currency Transactions and Advance Consideration.*

Other than FRS 109, the adoption of the FRS and interpretation did not have a material effect on the Company's financial statements.

Due to the transition methods chosen by the Company in applying the standard, comparative information throughout these financial statements has not been restated to reflect the requirements of the new standard.

The effect of initially applying the standard is mainly attributed to the increase in impairment losses recognised on financial assets.

FRS 109 *Financial instruments*

FRS 109 *Financial Instruments* sets out requirements for recognising and measuring financial assets and financial liabilities. It also introduces a new ECLs model. The Company adopted FRS 109 from 1 April 2018.

As a result of the adoption of FRS 109, the Company has adopted consequential amendments to FRS 1 *Presentation of Financial Statements*, which require impairment of financial assets to be presented in a separate line item in the statement of comprehensive income.

The Company has adopted consequential amendments to FRS 107 *Financial Instruments: Disclosures* that are applied to disclosures about 2018 but have not been generally applied to comparative information.

Changes in accounting policies resulting from the adoption of FRS 109 have been applied by the Company retrospectively, except as described below.

- The Company has used an exemption not to restate comparative information for prior periods with respect to classification and measurement (including impairment) requirements. Differences in the carrying amounts of financial assets and financial liabilities resulting from the adoption of FRS 109 are recognised in accumulated surplus as at 1 April 2018. Accordingly, the information presented for 2017 does not generally reflect the requirements of FRS 109, but rather those of FRS 39.

- The following assessments have been made on the basis of the facts and circumstances that existed at 1 April 2018.
  - The determination of the business model within which a financial asset is held.
  - The determination of whether the contractual terms of a financial asset give rise to cash flows that are solely payments of principal and interest on the principal amount outstanding.

An explanation of how the adoption of FRS 109 has affected the balance sheet of the Company is set out under the summary of quantitative impact and the accompanying notes.

The following table summarises the impact, net of tax, of transition to FRS 109 on the opening balance of accumulated fund.

	Impact of adopting FRS 109 on opening balance $
Accumulated fund	
Recognition of expected credit losses under FRS 109 for trade and other receivables	106,662
Impact at 1 April 2018	106,662

The impact upon adoption of FRS 109 is described below.

(i) Classification of financial assets and financial liabilities

Under FRS 109, financial assets are classified in the following categories: measured at amortised cost, fair value through other comprehensive income ('FVOCI') – equity instrument; or fair value through profit or loss ('FVTPL'). The classification of financial assets under FRS 109 is generally based on the business model in which a financial asset is managed and its contractual cash flow characteristics. FRS 109 eliminates the previous FRS 39 categories of held-to-maturity, loans and receivables and available-for-sale.

FRS 109 largely retains the existing requirements in FRS 39 for the classification and measurement of financial liabilities.

The adoption of FRS 109 has not had a significant effect on the Company's accounting policies for financial liabilities.

The following table and the accompanying notes below explain the original measurement categories under FRS 39 and the new measurement categories under FRS 109 for each class of the Company's financial assets as at 1 April 2018:

	Note	Original classification under FRS 39	New classification under FRS 109	Original carrying amount under FRS 39	New carrying amount under FRS 109
Financial assets					
Trade and other receivables	(a)	Loans and receivables	Amortised cost	15,977,543	15,870,881
Cash and cash equivalents		Loans and receivables	Amortised cost	10,117,110	10,117,110
Total financial assets				26,094,653	25,987,991

a) Trade and other receivables that were classified as loans and receivables under FRS 39 are now classified at amortised cost. An increase of $106,662 in the allowance for impairment was recognised in opening accumulated fund of the Company at 1 April 2018 on transition to FRS 109.

(ii) Impairment of financial assets

FRS 109 replaces the 'incurred loss' model in FRS 39 with an ECLs model. The new impairment model applies to financial assets measured at amortised cost.

As a result of the adoption of FRS 109, the Company presented impairment loss related to trade and other receivables, separately in the statement of comprehensive income.

The application of FRS 109 impairment requirements at 1 April 2018 results in increase in allowances for impairment as follows:

	$
Loss allowance at 31 March 2018 under FRS 39	–
Increase in impairment recognised at 1 April 2018 on:	
Trade and other receivables as at 31 March 2018	106,662
Loss allowance at 1 April 2018 under FRS 109	106,662

Loss allowance for financial assets measured at amortised cost are deducted from the gross carrying amount of the assets.

Additional information about how the Company measures the allowance for impairment is described in note 20.

3. Significant accounting policies

The accounting policies set out below have been applied consistently to all periods presented in these financial statements, and have been applied consistently by the Company, except as explained in note 2.6, which addresses changes in accounting policies.

3.1 Foreign currency

Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currency of the Company at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are translated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on monetary items is the difference between amortised cost in the functional currency at the beginning of the year, adjusted for effective interest and payments during the year, and the amortised cost in foreign currency translated at the exchange rate at the end of the year.

Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are translated to the functional currency at the exchange rate at the date that the fair value was determined. Non-monetary items in a foreign currency that are measured in terms of historical cost are translated using the exchange rate at the date of the transaction. Foreign currency differences arising on translation are recognised in surplus or deficit.

3.2 Financial instruments

(i) Recognition and initial measurement

Non-derivative financial assets and financial liabilities

Trade receivables are initially recognised when they are originated. All other financial assets and financial liabilities are initially recognised when the Company becomes a party to the contractual provisions of the instrument.

A financial asset (unless it is a trade receivable without a significant financing component) or financial liability is initially measured at fair value plus, for an item not at FVTPL, transaction costs that are directly attributable to its acquisition or issue. A trade receivable without a significant financing component is initially measured at the transaction price.

(ii) Classification and subsequent measurement

Non-derivative financial assets – Policy applicable from 1 April 2018

On initial recognition, a financial asset is classified as measured at amortised cost.

Financial assets are not reclassified subsequent to their initial recognition unless the Company changes its business model for managing financial assets, in which case all affected financial assets are reclassified on the first day of the first reporting period following the change in the business model.

Financial assets at amortised cost

A financial asset is measured at amortised cost if it meets both of the following conditions and is not designated as at FVTPL:

- it is held within a business model whose objective is to hold assets to collect contractual cash flows; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

Financial assets: Business model assessment – Policy applicable from 1 April 2018

The Company makes an assessment of the objective of the business model in which a financial asset is held at a portfolio level because this best reflects the way the business is managed and information is provided to management. The information considered includes:

- the stated policies and objectives for the portfolio and the operation of those policies in practice. These include whether management's strategy focuses on earning contractual interest income, maintaining a particular interest rate profile, matching the duration of the financial assets to the duration of any related liabilities or expected cash outflows or realising cash flows through the sale of the assets;
- how the performance of the portfolio is evaluated and reported to the Company's management;
- the risks that affect the performance of the business model (and the financial assets held within that business model) and how those risks are managed;
- how managers of the business are compensated – e.g. whether compensation is based on the fair value of the assets managed or the contractual cash flows collected; and
- the frequency, volume and timing of sales of financial assets in prior periods, the reasons for such sales and expectations about future sales activity.

Transfers of financial assets to third parties in transactions that do not qualify for derecognition are not considered sales for this purpose, consistent with the Company's continuing recognition of the assets.

Non-derivative financial assets: Assessment whether contractual cash flows are solely payments of principal and interest – Policy applicable from 1 April 2018

For the purposes of this assessment, 'principal' is defined as the fair value of the financial asset on initial recognition. 'Interest' is defined as consideration for the time value of money and for the credit risk associated with the principal amount outstanding during a particular period of time and for other basic lending risks and costs (e.g. liquidity risk and administrative costs), as well as a profit margin.

In assessing whether the contractual cash flows are solely payments of principal and interest, the Company considers the contractual terms of the instrument. This includes assessing whether the financial asset contains a contractual term that could change the timing or amount of contractual cash flows such that it would not meet this condition. In making this assessment, the Company considers:

- contingent events that would change the amount or timing of cash flows;
- terms that may adjust the contractual coupon rate, including variable-rate features;
- prepayment and extension features; and
- terms that limit the Company's claim to cash flows from specified assets (e.g. non-recourse features).

A prepayment feature is consistent with the solely payments of principal and interest criterion if the prepayment amount substantially represents unpaid amounts of principal and interest on the principal amount outstanding, which may include reasonable additional compensation for early termination of the contract. Additionally, for a financial asset acquired at a significant discount or premium to its contractual par amount, a feature that permits or requires prepayment at an amount that substantially represents the contractual par amount plus accrued (but unpaid) contractual interest (which may also include reasonable additional compensation for early termination) is treated as consistent with this criterion if the fair value of the prepayment feature is insignificant at initial recognition.

Non-derivative financial assets: Subsequent measurement and gains and losses – Policy applicable from 1 April 2018

Financial assets at amortised cost

These assets are subsequently measured at amortised cost using the effective interest method. The amortised cost is reduced by impairment losses. Interest income, foreign exchange gains and losses and impairment are recognised in surplus or deficit. Any gain or loss on derecognition is recognised in surplus or deficit.

Non-derivative financial assets – Policy applicable before 1 April 2018

The Company classifies non-derivative financial assets into loans and receivables.

Non-derivative financial assets: Subsequent measurement and gains and losses – Policy applicable before 1 April 2018

Loans and receivables

Loans and receivables are financial assets with fixed or determinable payments that are not quoted in an active market. Such assets are initially measured at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, loans and receivables are measured at amortised cost using the effective interest method, less any impairment losses.

Loans and receivables comprise trade and other receivables, and cash and cash equivalents.

Non-derivative financial liabilities: Classification, subsequent measurement and gains and losses

Financial liabilities are classified as measured at amortised cost.

These financial liabilities are initially measured at fair value less directly attributable transaction costs. They are subsequently measured at amortised cost using the effective interest method. Interest expense and foreign exchange gains and losses are recognised in surplus or deficit. These financial liabilities comprised trade and other payables and employee benefits – liability for short term accumulating compensated absences.

(iii) Derecognition

Financial Assets

The Company derecognises a financial asset when the contractual rights to the cash flows from the financial asset expire, or it transfers the rights to receive the contractual cash flows in a transaction in which substantially all of the risks and rewards of ownership of the financial asset are transferred or in which the Company neither transfers nor retains substantially all of the risks and rewards of ownership and it does not retain control of the financial asset.

The Company enters into transactions whereby it transfers assets recognised in its balance sheet, but retains either all or substantially all of the risks and rewards of the transferred assets. In these cases, the transferred assets are not derecognised.

Financial liabilities

The Company derecognises a financial liability when its contractual obligations are discharged or cancelled, or expire. The Company also derecognises a financial liability when its terms are modified and the cash flows of the modified liability are substantially different, in which case a new financial liability based on the modified terms is recognised at fair value.

On derecognition of a financial liability, the difference between the carrying amount extinguished and the consideration paid (including any non-cash assets transferred or liabilities assumed) is recognised in surplus or deficit.

(iv) Offsetting

Financial assets and financial liabilities are offset and the net amount presented in the balance sheet when, and only when, the Company currently has a legally enforceable right to set off the amounts and it intends either to settle them on a net basis or to realise the asset and settle the liability simultaneously.

The Company does not have any financial assets and financial liabilities that:

- are offset in the balance sheet; or
- are subject to an enforceable master netting arrangement, irrespective of whether they are offset in the balance sheet.

(v) Cash and cash equivalents

Cash and cash equivalents comprise cash and bank balances.

3.3 Property, plant and equipment

Recognition and measurement

Items of property, plant and equipment are measured at cost less accumulated depreciation and accumulated impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the asset. The cost of self-constructed assets includes:

- the cost of materials and direct labour;
- any other costs directly attributable to bringing the assets to a working condition for their intended uses;
- when the Company has an obligation to remove the asset or restore the site, an estimate of the costs of dismantling and removing the items and restoring the site on which they are located; and
- capitalised borrowing costs.

Purchased software that is integral to the functionality of the related equipment is capitalised as part of that equipment.

Construction-in-progress comprises the capitalised costs of on-going capital projects.

Low value assets costing less than $1,000 individually are written off in the period of outlay.

When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

The gain or loss on disposal of an item of property, plant and equipment is recognised in surplus or deficit.

Subsequent costs

The cost of replacing a component of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the component will flow to the Company, and its cost can be measured reliably. The carrying amount of the replaced component is derecognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in surplus or deficit as incurred.

Depreciation

Depreciation is calculated based on the cost of an asset, less its residual value. Significant components of individual assets are assessed and if a component has a useful life that is different from the remainder of that asset, that component is depreciated separately.

Depreciation is recognised as an expense in surplus or deficit on a straight-line basis over the estimated useful lives of each component of an item of property, plant and equipment, unless it is included in the carrying amount of another asset.

Construction-in-progress is not depreciated.

Depreciation is recognised from the date that the property, plant and equipment are installed and are ready for use, or in respect of internally constructed assets, from the date that the asset is completed and ready for use.

The estimated useful lives for the current and comparative years are as follows:

Building improvements	10 years
Medical and laboratory equipment	8 years
Computers	3 years
Office equipment	5 years
Furniture and fittings	8 years
Motor vehicles	5 years

Depreciation methods, useful lives and residual values are reviewed at the end of each reporting period and adjusted if appropriate.

3.4 Intangible assets

Computer software, which is not an integral part of the related hardware, is accounted for as an intangible asset and is stated at cost less accumulated amortisation and accumulated impairment losses.

Subsequent expenditure

Subsequent expenditure is capitalised only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditure, including expenditure on internally generated goodwill and brands, is recognised in surplus or deficit as incurred.

Amortisation

Amortisation is calculated based on the cost of asset, less its residual value.

Amortisation of computer software is recognised in surplus or deficit on a straight-line basis over its estimated useful life of 3-5 years, from the date that they are available for use.

Amortisation methods, useful lives and residual values are reviewed at the end of each reporting period and adjusted if appropriate.

3.5 Impairment

(i) Non-derivative financial assets

Policy applicable from 1 April 2018

The Company recognises loss allowances for ECLs on financial assets measured at amortised cost.

Loss allowances of the Company are measured on either of the following bases:

- 12-month ECLs: these are ECLs that result from default events that are possible within the 12 months after the reporting date (or for a shorter period if the expected life of the instrument is less than 12 months); or
- Lifetime ECLs: these are ECLs that result from all possible default events over the expected life of a financial instrument.

Simplified approach

The Company applies the simplified approach to provide for ECLs for all trade receivables. The simplified approach requires the loss allowance to be measured at an amount equal to lifetime ECLs.

General approach

The Company applies the general approach to provide for ECLs on all other financial instruments. Under the general approach, the loss allowance is measured at an amount equal to 12-month ECLs at initial recognition.
At each reporting date, the Company assesses whether the credit risk of a financial instrument has increased significantly since initial recognition. When credit risk has increased significantly since initial recognition, loss allowance is measured at an amount equal to lifetime ECLs.

When determining whether the credit risk of a financial asset has increased significantly since initial recognition and when estimating ECLs, the Company considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on the Company's historical experience and informed credit assessment and including forward-looking information.

If credit risk has not increased significantly since initial recognition or if the credit quality of the financial instruments improve such that there is no longer a significant increase in credit risk since initial recognition, loss allowance is measured at an amount equal to 12-month ECLs.

The Company considers a financial asset to be in default when:

- the borrower is unlikely to pay its credit obligations to the Company in full, without recourse by the Company to actions such as realising security (if any is held); or
- the financial asset is more than 1 to 3 years past due, taking into consideration historical payment track records, current macroeconomics situation as well as the general industry trend.

The maximum period considered when estimating ECLs is the maximum contractual period over which the Company is exposed to credit risk.

Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all cash shortfalls (i.e. the difference between the cash flows due to the entity in accordance with the contract and the cash flows that the Company expects to receive). ECLs are discounted at the effective intest rate of the financial asset.

Credit-impaired financial assets

At each reporting date, the Company assesses whether financial assets carried at amortised cost are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred.

Evidence that a financial asset is credit-impaired includes the following observable data:

- significant financial difficulty of the borrower or issuer;
- a breach of contract such as a default or being more than 1 to 3 years, taking into consideration historical payment track records, current macroeconomics situation as well as the general industry trend;
- the restructuring of a loan or advance by the Company on terms that the Company would not consider otherwise;
- it is probable that the borrower will enter bankruptcy or other financial reorganisation; or
- the disappearance of an active market for a security because of financial difficulties.

Presentation of allowance for ECLs in the balance sheet

Loss allowances for financial assets measured at amortised cost are deducted from the gross carrying amount of these assets.

Write-off

The gross carrying amount of a financial asset is written off (either partially or in full) to the extent that there is no realistic prospect of recovery. This is generally the case when the Company determines that the debtor does not have assets or sources of income that could generate sufficient cash flows to repay the amounts subject to the write-off. However, financial assets that are written off could still be subject to enforcement activities in order to comply with the Company's procedures for recovery of amounts due.

Policy applicable before 1 April 2018

A financial asset not carried at fair value through profit or loss is assessed at the end of each reporting period to determine whether there is objective evidence that it is impaired. A financial asset is impaired if objective evidence indicates that a loss event(s) has occurred after the initial recognition of the asset, and that the loss event(s) has an impact on the estimated future cash flows of that asset that can be estimated reliably.

Objective evidence that financial assets (including equity securities) are impaired can include default or delinquency by a debtor, restructuring of an amount due to the Company on terms that the Company would not consider otherwise, indications that a debtor or issuer will enter bankruptcy, adverse changes in the payment status of borrowers or issuers, economic conditions that correlate with defaults or the disappearance of an active market for a security.

Loans and receivables

The Company considers evidence of impairment for loans and receivables at both a specific asset and collective level. All individually significant loans and receivables are assessed for specific impairment. All individually significant loans and receivables found not to be specifically impaired are then collectively assessed for any impairment that has been incurred but not yet identified. Loans and receivables that are not individually significant are collectively assessed for impairment by grouping together loans and receivables with similar risk characteristics.

In assessing collective impairment, the Company uses historical trends of the probability of default, the timing of recoveries and the amount of loss incurred, adjusted for management's judgement as to whether current economic and credit conditions are such that the actual losses are likely to be greater or less than suggested by historical trends.

An impairment loss in respect of a financial asset measured at amortised cost is calculated as the difference between its carrying amount and the present value of the estimated future cash flows, discounted at the asset's original effective interest rate. Losses are recognised in surplus or deficit and reflected in an allowance account against loans and receivables. Interest on the impaired asset continues to be recognised. When the Company considers that there are no realistic prospects of recovery of the asset, the relevant amounts are written off. If the amount of impairment loss subsequently decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, then the previously recognised impairment loss is reversed through surplus or deficit.

(ii) Non-financial assets

The carrying amounts of the Company's non-financial assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. An impairment loss is recognised if the carrying amount of an asset or its related cash-generating unit ('CGU') exceeds its estimated recoverable amount.

The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or CGU. For the purpose of impairment testing, assets that cannot be tested individually are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows of other assets or CGU.

The Company's corporate assets do not generate separate cash inflows and are utilised by more than one CGU. Corporate assets are allocated to CGUs on a reasonable and consistent basis and tested for impairment as part of the testing of the CGU to which the corporate asset is allocated.

Impairment losses are recognised in surplus or deficit. Impairment losses recognised in respect of CGUs are allocated first to reduce the carrying amount of any goodwill allocated to the CGU (group of CGUs), and then to reduce the carrying amounts of the other assets in the CGU (group of CGUs) on a *pro rata* basis.

Impairment loss recognised in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

3.6 Employee benefits

Defined contribution plans

A defined contribution plan is a post-employment benefit plan under which an entity pays fixed contributions into a separate entity and will have no legal or constructive obligation to pay further amounts. Obligations for contributions to defined contribution pension plans are recognised as an employee benefit expense in surplus or deficit in the periods during which related services are rendered by employees.

Short-term employee benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognised for the amount expected to be paid under short-term cash bonus or profit-sharing plans if the Company has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee, and the obligation can be estimated reliably.

3.7 Provision

A provision is recognised if, as a result of a past event, the Company has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognised as finance cost.

3.8 Income Recognition

Grant income

Grant income designated for research purposes is recognised in surplus or deficit when the relevant qualifying costs are incurred. The deferral of certain grant income is described in note 3.9.

Grants which are designated for property, plant and equipment, and intangible assets purchases whose individual value of more than $1,000 and $10,000 respectively are taken to deferred income in the period of receipt. The deferred income is amortised over the useful life of the property, plant and equipment and intangible assets by crediting to the surplus or deficit an amount so as to match the related depreciation and amortisation expense.

Programme fees

Programme fees relate to fees or income which the Company receives when it carries out activities through direct service provision to undertake the work that contributes to its objectives. Programme fees are recognised in surplus or deficit when the relevant milestone is achieved.

3.9 Government Grants

Government grants related to property, plant and equipment and intangible assets are taken to deferred income or to the surplus or deficit for assets which are written off in the year of purchase. Such government grant recognised in deferred income is recognised in the surplus or deficit over the periods necessary to match the depreciation/amortisation and write off of the property, plant and equipment and intangible assets purchased with the related grants. Upon the disposal of the property, plant and equipment and intangible assets, the balance of the related deferred income is recognised in the surplus or deficit to reflect the net book value of the assets disposed.

Government subvention

Government subvention is accounted for on an accrual basis in the surplus or deficit when there is reasonable assurance that the Company has complied with all the terms and conditions attached to the subvention and that there is reasonable certainty that the subvention will be received. Government subvention is a subsidy from the Ministry of Health for expenses incurred in relation to the Temporary occupation licence.

3.10 Research

Expenditure on research activities, undertaken with the prospect of gaining new scientific or technical knowledge and understanding, is recognised in surplus or deficit as incurred.

3.11 Lease payments

Payments made under operating leases are recognised in surplus or deficit on a straight-line basis over the term of the lease. Lease incentives received are recognised as an integral part of the total lease expense, over the term of the lease.

3.12 Finance income & finance costs

The Company's finance income and finance costs include foreign currency gain or loss on financial assets and financial liabilities.

Foreign currency gains and losses on financial assets and financial liabilities are reported on a net basis as either finance income or finance cost depending on whether foreign currency movements are in a net gain or net loss position.

3.13 Tax

The Company has been registered as a Charity, under Charities Act, Cap. 37 with effect from 27 November 2002. No provision for taxation has been made in the financial statements as the Company is a registered charity with income tax exemption.

3.14 Adoption of new standards not yet adopted

A number of new standards and interpretations and amendments to standards are effective for annual periods beginning after 1 April 2018 and earlier application is permitted; however, the Company has not early adopted the new or amended standards and interpretations in preparing these financial statements.

The following standard is expected to have a material impact on the Company's financial statements in the period of initial application.

Applicable to 2020 financial statements

FRS 116 *Leases*

FRS 116 introduces a single, on-balance sheet lease accounting model for lessees. A lessee recognises a right-of-use (ROU) asset representing its right to use the underlying asset and a lease liability representing its obligation to make lease payments. There are recognition exemptions for short-term leases and leases of low-value items. Lessor accounting remains similar to FRS 17 *Leases*. FRS 116 replaces existing lease accounting guidance, including FRS 17 *Leases*, INT FRS 104 *Determining whether an Arrangement contains a Lease*, INT FRS 15 *Operating Leases – Incentives*, and INT FRS 27 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*. The standard is effective for annual periods beginning on or after 1 April 2019, with early adoption permitted.

The Company plans to apply FRS 116 initially on 1 April 2019, using the modified retrospective approach. Therefore, the cumulative effect of adopting FRS 116 will be recognised as an adjustment to the opening balance of accumulated fund at 1 April 2019, with no restatement of comparative information. The Company plans to apply the practical expedient to grandfather the definition of a lease on transition. This means that they will apply FRS 116 to all contracts entered into before 1 April 2019 and identified as lease in accordance with FRS 17 and INT FRS 104.

The Company as a lessee

The Company expects to measure lease liabilities by applying a single discount rate to its portfolio of leases. Furthermore, the Company is likely to apply the practical expedient to recognise amounts of ROU assets equal to their lease liabilities at 1 April 2019. For lease contracts that contain the option to renew, the Company is expected to use hindsight in determining the lease term.

The Company expects its existing operating lease arrangements to be recognised as ROU assets with corresponding lease liabilities under FRS 116. Lease payments that are increased every five years to reflect market rentals, and those that are based on changes in local price index, are included in the measurement of lease liabilities as at date of initial application. In addition, the Company will no longer recognise provisions for operating leases that it assessed to be onerous. Instead, the Company will include the payments due under the lease in its lease liability.

The Company has performed a preliminary assessment of the new standard on its existing operating lease arrangements as a lessee. There are several existing non-cancellable operating lease agreements in which the Company is a lessee. Overall, the Company expects these operating leases to be recognised as ROU assets with corresponding lease liabilities under the new standard. Such operating lease commitments on an undiscounted basis amount to approximately $3,907,486 as at 31 March 2019 (note 21).

The nature of expenses related to those leases will change as FRS 116 replaces the straight- line operating lease expense with depreciation charge for ROU assets and interest expense on lease liabilities.

4. Property. plant and equipment

	Building Improvements	Medical and laboratory equipment	Computers	Office Equipment	Furniture and fittings	Motor vehicle	Construction-in-progress	Total
	$	$	$	$	$	$	$	$
Cost								
At 1 April 2017	1,047,102	16,846,289	1,379,808	120,521	323,304	–	–	19,717,024
Additions	–	1,334,090	110,338	–	63,733	401,661	143,367	2,053,189
Disposals	–	(1,295,665)	(4,090)	–	–	–	–	(1,299,755)
Transfer	–	126,994	–	–	–	–	(126,994)	–
At 31 March 2018	1,047,102	17,011,708	1,486,056	120,521	387,037	401,661	16,373	20,470,458
Additions	–	630,835	172,111	1,711	26,003	–	422,128	1,252,788
Disposals	–	(720,414)	(6,732)	–	–	(196,880)	–	(924,026)
At 31 March 2019	1,047,102	16,922,129	1,651,435	122,232	413,040	204,781	438,501	20,799,220
Accumulated depreciation								
At 1 April 2017	1,036,188	11,187,058	1,205,697	116,180	209,437	–	–	13,754,560
Depreciation charge for the year	4,378	1,396,723	125,124	2,090	30,535	40,166	–	1,599,016
Disposals	–	(1,257,327)	(4,090)	–	–	–	–	(1,261,417)
At 31 March 2018	1,040,566	11,326,454	1,326,731	118,270	239,972	40,166	–	14,092,159
Depreciation charge for the year	3,479	1,289,691	109,066	1,088	37,385	40,956	–	1,481,665
Disposals	–	(553,250)	(6,732)	–	–	(19,688)	–	(579,670)
At 31 March 2019	1,044,045	12,062,895	1,429,065	119,358	277,357	61,434	–	14,994,154
Carrying amounts								
At 1 April 2017	10,914	5,659,231	174,111	4,341	113,867	–	–	5,962,464
At 31 March 2018	6,536	5,685,254	159,325	2,251	147,065	361,495	16,373	6,378,299
At 31 March 2019	3,057	4,859,234	222,370	2,874	135,683	143,347	438,501	5,805,066

Intangible assets

	Computer software $
Cost	
At 1 April 2017	1,715,408
Additions	18,127
At 31 March 2018	1,733,535
Additions	29,889
At 31 March 2019	1,763,424
Accumulated amortisation	
At 1 April 2017	1,322,494
Amortisation charge for the year	248,623
At 31 March 2018	1,571,117
Amortisation charge for the year	125,034
At 31 March 2019	1,696,151
Carrying amounts	
At 1 April 2017	392,914
At 31 March 2018	162,418
At 31 March 2019	67,273

Trade and other receivables

	Note	2019 $	2018 $
Deposits and other receivables	7	15,884,243	13,017,656
Trade amounts due from:			
- Immediate holding company		3,622,153	2,025,662
- Intermediate holding company		527,873	722,139
- Related corporations		45,857	212,086
		20,080,126	15,977,543

Outstanding balances with related parties are unsecured. There is no allowance for doubtful debts arising from these outstanding balances.

Information about the Company's exposure to credit risks and impairment losses for trade and other receivables are included in note 20.

Deposits and other receivables

	Note	2019 $	2018 $
Deposits		1,193	16,895
Receivables from funding bodies		15,024,917	12,347,354
Grant receivables from third parties		911,674	545,768
Sundry receivables		26,227	107,639
		15,964,011	13,017,656
Less: Impairment loss		(79,768)	–
	6	15,884,243	13,017,656

Receivables from funding bodies are non-interest bearing and have no credit terms.

Cash and cash equivalents

	2019 $	2018 $
Cash at bank and in hand	9,644,088	10,117,110

Accumulated fund

The Company is limited by guarantee and has no share capital. In the event of a winding up of the Company, the liability of each member of the Company is limited to such amount as may be required, but not exceeding the sum of one hundred dollars ($100). The accumulated fund represents the cumulative surplus or deficit of the Company.

The Company's reserve policy is to maintain funds at a minimum sufficient to cover budgeted operating and capital cost for the current fiscal year. In the event of an operating deficit or a shortfall of current assets over current liabilities, the Company will obtain appropriate financial support from its immediate holding company to pay liabilities, as and when they fall due.

Capital management

Capital comprises the accumulated fund of the Company. The Company's operation is funded primarily from grants from various funding bodies and loan from immediate holding company. There was no change in the Company's approach to capital management during the year. The Company is not subject to externally imposed capital requirements.

Deferred income

	2019 $	2018 $
At cost	21,085,439	21,220,003
Less: Accumulated amortisation:		
At 1 April	14,815,637	14,391,969
Amortisation charge for the year	1,535,058	1,708,451
Disposal of assets funded by grants	(575,691)	(1,284,783)
At 31 March	15,775,004	14,815,637
	5,310,435	6,404,366
Non-current	3,693,492	4,451,576
Current	1,616,943	1,952,790
	5,310,435	6,404,366

Deferred income relates to capital expenditure grants (note 14) received for the purchase of property, plant and equipment ("PPE") and intangible assets ("IA"). Deferred income is amortised over the periods necessary to match the depreciation of the PPE and amortisation of the IA purchased with the related grants.

Trade payables

	2019 $	2018 $
Trade payables	2,060,549	2,714,656
Trade amounts due to:		
- Immediate holding company	1,353,748	456,044
- Intermediate holding company	4,720,733	2,745,994
- Related corporations	382,156	302,189
	8,517,186	6,218,883

The Company's exposure to currency and liquidity risks related to trade payables is disclosed in note 20.

Other payables

	2019 $	2018 $
Accrued operating expenses	3,058,449	2,960,579
Loans from immediate holding company	6,000,000	6,000,000
Research grants received in advance from government	2,897,777	3,514,533
Research grants received in advance from third parties	5,472,040	3,068,956
Research grants received in advance from related corporation	4,569,718	4,334,946
Refundable deposits	940	940
	21,998,924	19,879,954

Loans from immediate holding company are unsecured, interest-free and repayable on demand.

The Company's exposure to currency and liquidity risks related to other payables is disclosed in note 20.

Employee benefits

	2019 $	2018 $
Liability for short-term accumulating compensated absences	722,054	735,420

Operating / Capital expenditure grants

These grants are received mainly from National Medical Research Council, Biomedical Research Council, SingHealth Foundation, Singapore Health Services Pte Ltd, Singapore National Eye Centre Pte Ltd and SNEC Health Research Endowment Fund for research projects.

Other income

	2019 $	2018 $
Other research grants and programme fees	2,820,929	3,597,279
Other miscellaneous income	269,356	703,717
	3,090,285	4,300,996

Finance costs

	2019 $	2018 $
Net foreign exchange gain/(loss)	8,098	(2,606)

Government Subvention

Government subvention is recognised in the surplus or deficit when conditions attached to its recognition are met by the Company. The Government is currently reviewing and finalising the subvention paid and payable to the Company in respect of the current year, no adjustment has been made in the financial statements for this component in the current financial year.

Tax expense

The Company is a non-profit organisation registered with the Commissioner of Charities under the Singapore Charities Act. With effect from Year of Assessment 2008, all registered and exempt charities will enjoy automatic income tax exemption. Thus, no provision for taxation was made in the financial statements.

Surplus/(Deficit) for the year

The following items have been included in arriving at surplus/(deficit) for the year:

	2019 $	2018 $
Temporary occupation licence ('TOL') and other operating lease expense	2,375,745	2,226,850
Contributions to defined contribution plan included in staff costs	1,633,709	1,702,294
Loss on disposal of property, plant and equipment	–	16,938

Financial Instruments

Overview

The Company has exposure to the following risks from its use of financial instruments:

- credit risk
- liquidity risk
- market risk

This note presents information about the Company's exposure to each of the above risks, the Company's objectives, policies and processes for measuring and managing risk.

Risk management framework

Risk management is integral to the whole business of the Company. The Company has a system of controls in place to create an acceptable balance between cost of risks and the cost of managing the risks. The management continually monitors the Company's risk management process to ensure that an appropriate balance between risk and control is achieved. Risk management policies and systems are reviewed regularly to reflect changes in market conditions and the Company's activities.

Credit risk

Credit risk is the risk of financial loss to the Company if a customer or counterparty to a financial instrument fails to meet its contractual obligations, arises principally from the funding bodies and related parties, as and when they fall due.

The carrying amount of financial assets in the balance sheet represents the Company's respective maximum exposure to credit risk, before taking into account any collateral held. The Company does not hold any collateral in respect of its financial assets.

Financial assets measured at amortised cost

The Company has a credit policy in place and the exposure to credit risk is monitored on an ongoing basis.

The allowance account in respect of trade and other receivables is used to record impairment losses unless the Company is satisfied that no recovery of the amount owing is possible. At that point, the financial asset is considered irrecoverable and the amount charged to the allowance account is written off against the carrying amount of the impaired financial asset.

Cash is placed with financial institutions which are regulated.

The Company's primary exposure to credit risk arises through its receivables from funding bodies and corporations. These parties are established and reputable institutions which management regarded the associated credit risk to be minimum. The Company's historical experience in the collection of accounts receivable falls within the recorded allowances for impairment losses. Due to these factors, management believes that no additional credit risk beyond the amounts provided for collection losses is inherent in the Company's trade and other receivables.

The maximum exposure to credit risk for trade and other receivables of the Company at the reporting date (by type of debtor) is:

	2019 $	2018 $
Funding bodies	15,024,917	12,347,354
Corporations	5,055,209	3,630,189
	20,080,126	15,977,543

Impairment losses

The ageing of trade and other receivables that were not impaired at the reporting date was:

	2019		2018
	Not credit-impaired	Credit-impaired	
	$	$	$
Not past due	19,845,978	–	15,696,377
Past due 1 – 30 days	88,301	–	122,566
Past due 31 – 150 days	144,286	–	122,813
Past due over 150 days	80,689	640	35,787
Total gross carrying amount	20,159,254	640	15,977,543
Loss allowance	(79,128)	(640)	–
	20,080,126	–	15,977,543

Expected credit loss assessment for funding bodies and corporations as at 1 April 2018 and 31 March 2019

The Company uses an allowance matrix to measure the ECLs of trade and other receivables from funding bodies and corporations (excluding related parties).

Loss rates are calculated using a 'roll rate' method based on the probability of a receivable progressing through successive stages of delinquency to write-off.

Trade and other receivables from funding bodies of $15,024,917 as at 31 March 2019 are neither past due nor impaired.

The following table provides information about the exposure to credit risk and ECLs for trade and other receivables from corporations (excluding related parties) as at 31 March 2019:

	Weighted average loss rate	Gross	Impairment losses
	%	$	$
Not past due	6.5	625,178	40,775
Past due 1 – 30 days	9.9	88,301	8,748
Past due 31 – 150 days	6.7	144,286	9,638
Past due over 150 days	25.3	81,329	20,607
		939,094	79,768

Loss rates are based on actual credit loss experience over the past three years. These rates are adjusted by scalar factors to reflect differences between economic conditions during the period over which the historic data has been collected, current conditions and the Company's view of economic conditions over the expected lives of the receivables. These scalar factors are calculated using statistical models that determine numeric co-relation of loss rates with relevant economic variables.

Amounts due from related parties

Impairment on these balances has been measured on the 12-month expected loss basis which reflects the low credit risk of the exposures. The amount of the allowance on these balances is insignificant.

Movements in allowance for impairment in respect of trade and other receivables

The movement in the allowance for impairment in respect of trade and other receivables during the year was as follows:

	$
At 1 April 2017 and 31 March 2018 per FRS 39	–
At 1 April 2018 per FRS 39	–
Adjustment on initial application of FRS 109	106,662
At 1 April 2018 per FRS 109	106,662
Reversal of impairment loss	(26,894)
At 31 March per 2019 FRS 109	79,768

Cash and cash equivalents

The Company held cash and cash equivalents of $9,644,088 at 31 March 2019 (2018:$ 10,117,110). The cash and cash equivalents are held with bank and financial institution counterparties.

Impairment on cash and cash equivalents has been measured on the 12-month expected loss basis and reflects the short maturities of the exposures. The Company considers that its cash and cash equivalents have low credit risk based on the external credit ratings of the counterparties. The amount of the allowance on cash and cash equivalents was negligible.

Liquidity risk

Liquidity risk is the risk that the Company will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Company's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due under normal and stressed conditions without incurring unacceptable losses or risking damage to the Company's reputation.

The Company's operation is funded primarily from grants from National Medical Research Council and loans from immediate holding company. As such, the Company's exposure to liquidity risk is minimised.

The Company monitors its liquidity risk and maintains a level of cash and cash equivalents deemed adequate by management to finance the Company's operations and to mitigate the effects of fluctuations in cash flows.

The immediate holding company has agreed to provide financial support as is necessary for the next twelve months to enable the Company to meet its liabilities as and when they fall due (see note 2.1).

The following are the contractual maturities of financial liabilities, including estimated interest payments and excluding the impact of netting agreements:

	Note	Carrying amount $	Total contractual cash flows $	Within 1 year $
2019				
Non-derivative financial liabilities				
Trade payables	11	8,517,186	(8,517,186)	(8,517,186)
Other payables*	12	9,059,389	(9,059,389)	(9,059,389)
Employee benefits – liability for short term accumulating compensated absences	13	722,054	(722,054)	(722,054)
		18,298,629	(18,298,629)	(18,298,629)
2018				
Non-derivative financial liabilities				
Trade payables	11	6,218,883	(6,218,883)	(6,218,883)
Other payables*	12	8,961,519	(8,961,519)	(8,961,519)
Employee benefits – liability for short term accumulating compensated absences	13	735,420	(735,420)	(735,420)
		15,915,822	(15,915,822)	(15,915,822)

* Excludes research grants received in advance from government, third parties and related corporation

The maturity analysis shows the undiscounted cash flows of the Company's financial liabilities on the basis of their earliest possible contractual maturity.

Market risk

Market risk is the risk that changes in market prices, such as interest rates, foreign exchange rates and equity prices will affect the Company's income or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimising the return.

Interest rate risk

The Company has no significant exposure to interest rate risk.

Foreign currency risk

The financial assets and liabilities of the Company are primarily denominated in Singapore dollars. The Company has no significant exposure to foreign currency risk.

Measurement of fair values

The Company has an established control framework with respect to the measurement of fair values.

If third party information, such as broker quotes, property valuations or pricing services, is used to measure fair values, then the Company assesses and documents the evidence obtained from the third parties to support the conclusion that such valuations meet the requirements of FRS, including the level in the fair value hierarchy in which such valuations should be classified.

When measuring the fair value of an asset or a liability, the Company uses market observable data as far as possible. Fair values are categorised into different levels in a fair value hierarchy based on the inputs used in the valuation techniques as follows:

- *Level 1:* quoted prices (unadjusted) in active markets for identical assets or liabilities.
- *Level 2*: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e., as prices) or indirectly (i.e., derived from prices).
- *Level 3*: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

If the inputs used to measure the fair value of an asset or a liability fall into different levels of the fair value hierarchy, then the fair value measurement is categorised in its entirety in the same level of the fair value hierarchy as the lowest level input that is significant to the entire measurement (with Level 3 being the lowest).

The Company recognises transfers between levels of the fair value hierarchy as of the end of the reporting period during which the change has occurred.

Accounting classifications and fair values

The carrying amounts of financial assets and liabilities, as shown below, with a maturity of less than one year (including trade and other receivables, cash and cash equivalents, trade payables, other payables and employee benefits) are approximate their fair values because of the short period to maturity. Accordingly, no fair value information is separately presented.

	Note	Amortised cost $	Other financial liabilities $	Total carrying amount $
31 March 2019				
Financial assets not measured at fair value				
Cash and cash equivalents	8	9,644,088	–	9,644,088
Trade and other receivables	6	20,080,126	–	20,080,126
		29,724,214	–	29,724,214
Financial liabilities not measured at fair value				
Trade payables	11	–	(8,517,186)	(8,517,186)
Other payables	12	–	(21,998,924)	(21,998,924)
Employee benefits	13	–	(722,054)	(722,054)
			(31,238,164)	(31,238,164)

	Note	Loans and receivables $	Other financial liabilities $	Total carrying amount $
31 March 2018				
Financial assets not measured at fair value				
Cash and cash equivalents	8	10,117,110	–	10,117,110
Trade and other receivables	6	15,977,543	–	15,977,543
		26,094,653	–	26,094,653
Financial liabilities not measured at fair value				
Trade payables	11	–	(6,218,883)	(6,218,883)
Other payables	12	–	(19,879,954)	(19,879,954)
Employee benefits	13	–	(735,420)	(735,420)
		–	(26,834,257)	(26,834,257)

Commitments

	2019 $	2018 $
Capital commitments:		
- contracted but not provided for	147,239	–

At 31 March 2019, the Company has commitments for future minimum lease payments under non-cancellable operating leases (including those under Temporary Occupation License) as follows:

	2019 $	2018 $
Within 1 year	2,093,553	2,185,725
After 1 year but within 5 years	1,813,933	7,250
	3,907,486	2,192,975

The operating lease commitments mainly relate to the lease of space and office equipment. The leases run for a period of one to four years with an option to renew the lease after that date.

Related parties

Collectively, but not individually significant transactions

The Company charges its immediate holding company for manpower services provided and purchases services from its intermediate holding company, immediate holding company and related corporations.

Other related party transactions

Other than disclosed elsewhere in the financial statements, the transactions with related parties are as follows:

	2019 $	2018 $
Other income received/receivable		
Intermediate holding company	(518,369)	(509,032)
Immediate holding company	(2,345,838)	(1,515,176)
Related corporation	(1,913,561)	(1,080,282)
Sale of other services		
Intermediate holding company	(46,729)	–
Immediate holding company	(109,083)	(36,650)
Related corporation	–	(162,098)
Purchase of manpower services		
Intermediate holding company	838,932	210,447
Immediate holding company	653,535	506,558
Related corporation	210,521	80,273

Purchase of other services		
Intermediate holding company	978,020	884,129
Immediate holding company	507,917	570,607
Related corporations	371,056	554,577
Purchase of supplies and consumables		
Intermediate holding company	560,239	456,313
Immediate holding company	5,886	9,283
Related corporations	1,103	–
Other expenses paid/payable		
Intermediate holding company	2,731,256	2,536,705
Immediate holding company	244,104	233,651
Related corporations	96,721	85,843

The Company occupies space at the premises of its intermediate and immediate holding companies. The current year rental of $144,113 (2018: $194,947) is waived by the immediate holding company.

Key management personnel remuneration

Key management personnel of the Company are those persons having the authority and responsibility for planning, directing and controlling the activities of the Company. The senior management are considered as key management personnel of the Company.

Key management personnel remuneration recognised in the statement of comprehensive income is as follows:

	2019	**2018**
	$	**$**
Key management personnel		
- short-term employee benefits	1,379,001	1,547,756
- contribution to defined contribution plan	59,965	56,967
	1,438,966	1,604,723

In compliance with the Code of Corporate Governance for Charities and Institutions of a Public Character - Guideline 8.3, the annual remuneration of the Company's three highest paid staff who each received remuneration exceeding $100,000, in the following bands in the year are as follows:

	2019	**2018**
Number of personnel in bands:		
- $200,001 to $300,000	–	1
- $300,001 to $400,000	3	1
- $400,001 to $500,000	–	1