

NEW ZEALAND SYNCHROTRON GROUP LIMITED



ANNUAL REPORT 2017

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CHAIRMAN'S REPORT

The year under review was the eleventh year during which the New Zealand Synchrotron Group Ltd (NZSG) has provided support for New Zealand researchers using the Australian Synchrotron. Access to synchrotron radiation is important to a steadily growing number of New Zealand based researchers. This is because the radiation, for example X-ray radiation, provided by a synchrotron is as much as a million times brighter than can be achieved on a conventional laboratory facility. The superior accuracy, clarity and specificity available only on a synchrotron, can make all the difference to the effectiveness and quality of the research being undertaken. The applications that New Zealand researchers have explored span a wide gamut of fields including protein crystallography, food technology, advanced materials, leather research, animal and plant imaging, drug development and soil analysis.



Through the NZSG, New Zealand based researchers have access as of right to the state of the art synchrotron in Melbourne. This right of access for New Zealand based scientists has been secured through a continuous contribution over eleven years of both capital and operational funding. These contributions have been set at a level agreed with the Australians which ensures that New Zealand participants are paying their way in Australia under a full cost recovery model. Agreed ongoing access is also now part of a government to government undertaking entered into by both countries. The New Zealand participation although modest in relation to the project as a whole, has enabled the scope of the facility to be expanded to the benefit of scientists in both countries. Throughout this period the New Zealand participants have been treated as equals with unfailing fairness and generosity by our Australian hosts.

The past year was to have been the first of a three-year funding and access regime under which New Zealand contributed 5% of the cost of operating the Synchrotron in return for 5% of the beamtime available to Australian and New Zealand users. The funds were provided jointly by the New Zealand government and nine of the company's shareholders. The 5% access level delivers approximately half the number of beamline shifts that was previously achieved when New Zealand researchers had unrestricted access to the merit pool plus dedicated Foundation Investor time. There has therefore been high demand for the available beamtime over the year and the company's Access Committee has had a difficult task taking the needs of the New Zealand research sector and the merit rankings of the Synchrotron's advisory committees into account when making the decisions on who receives the beamtime.

During the year, however, ANSTO announced plans to expand the capability of the Synchrotron by adding new beamlines to be funded by significant stakeholders. NZSG took the opportunity to enhance and expand New Zealand's use of the facility and was able to secure research sector and government support by arranging a funding and access package that will provide a 33% increase in the amount of time New

Zealand researchers can obtain on the existing beamlines and guarantee access rights at the increased levels to the new beamlines as they are built. The new access rights extend until June 2026. In return, New Zealand will contribute A\$12 million towards the cost of the new beamlines and continue to make an annual access payment of A\$1.5 million per year (increasing by a cost of living adjustment from 2020). This is a wonderful result for New Zealand research and will ensure that the high levels of productivity and excellence achieved in the past years can continue. I was delighted to be invited to speak at a function at the Synchrotron in late August to help celebrate the launch of the new beamline development programme. New Zealand's contribution was warmly recognised at this function.

The company had budgeted for a nil operating surplus for the year and achieved a final result of a loss of \$95,572. Although there was a surplus of \$101,553 from trading activities, the company's financial operations are particularly susceptible to movements in the exchange rate between the New Zealand and Australian currencies. This has been managed by purchasing vanilla options to preserve the value of future payments to ANSTO of the government's share of the annual access payment in the event of a dramatic fall in the value of the New Zealand dollar and taking forward contracts to purchase Australian currency at favourable exchange rates. The net change in value of the financial derivatives held during the year was \$200,125 which is effectively the cost of this approach to managing the exchange rate risk.

With the signing of the long-term funding and access agreements, directors have purchased another vanilla option to cover the medium term risk and have taken a forward contract on the part of the 2019 payment to ANSTO funded by MBIE.

Shareholder equity has decreased from \$585,643 to \$487,072. Given the uncertainty in currency exchange rate movements, the directors have taken steps since balance date to take forward cover to cover the next three year's payments to ANSTO. This has had the short term effect of reducing the level of cash reserves, but the directors believe that with the new funding agreements in place the financial position is sufficiently strong to do this.

The board has been very well supported by the Royal Society of New Zealand who provide secretariat services to NZSG. In particular, I would like to acknowledge the contribution made by Dr Don Smith in assisting the board, administering the New Zealand Synchrotron Support Programme and negotiating the funding and access arrangements. I would also like to acknowledge the contribution from the Chair of the Access Committee, Professor Geoff Jameson and its members Professor Vic Arcus, Dr Vladimir Golovko and Associate Professor Geoff Waterhouse who have evaluated all requests for access.

Finally, I would like to thank my fellow directors, Professors Geoff Jameson, Jim Metson, Mike McWilliams and Ian Shaw.



GA Carnaby
Chair

BUSINESS REVIEW

Investment in the Australian Synchrotron and Access Rights

Through the original investment in the Australian Synchrotron in October 2007, NZSG became a member of the Australian Synchrotron Company (ASCo) and a shareholder in the Australian Synchrotron Holding Company (ASHCo). As part of the restructuring of the Australian Synchrotron operations and funding in 2012, responsibility for operating the Synchrotron was transferred from ASCo to the Australian Nuclear Science and Technology Organisation (ANSTO) on 1 January 2013. ASCo was deregistered in June 2013, however NZSG remained a shareholder in ASHCo which leased the facility and equipment to SLSA to operate. The 5 million A\$1 shares in ASHCo held by NZSG were fully paid, however their value was written down to zero as at 30 June 2013 to reflect the cessation of access rights to all foundation investors in the Australian Synchrotron after August 2013. Those shares were transferred at no cost to ANSTO in July 2016 as part of the new ownership arrangement.

Under arrangements set in place last year to establish access rights to the Australian Synchrotron and provide funding for the operating costs of the facility, NZSG's shareholders have collectively contributed A\$750,000 which has been supplemented by equal funding from the New Zealand government. In total, A\$1.5 million has been provided as New Zealand's share of the operating costs for the year and in return New Zealand researchers have been entitled to 5% of the merit beamtime. These funds are channelled through the company which entered into a Funding and Access Agreement with ANSTO that governs the access arrangements until 30 June 2019. AgResearch, Plant & Food Research and Lincoln University did not have access to merit beamtime as they did not contribute to the sector's funding pool.

The contracts entered into last year have been superseded by a new set of contracts that extend and increase the access by 33% from 5% of the available beamtime to 6.639% until June 2026. This includes access to the new beamlines that are to be added to the Australian Synchrotron in the next four years. New Zealand is contributing A\$12 million towards the new beamlines. The cost of that contribution and of the annual access fee of A\$1.5 million is being shared between research sector and the government. AgResearch has rejoined the group of funding institutions. Callaghan Innovation has given notice that it will withdraw from July 2019.

Although the Synchrotron is now operated by an entity independent of the original foundation investors, its operations will be overseen by a Stakeholders Committee that monitors the Synchrotron's operations, budget and development and provide advice to ANSTO. The NZSG board has appointed Dr Don Smith to be the company's representative on the Stakeholders Committee Dr Smith is also the contact person for day-to-day matters associated with access arrangements and user liaison with ANSTO.

Decisions on Access and Funding Support

The Funding and Access Agreement with ANSTO also provides for the company to decide the way in which the 5% overall entitlement to beamtime was allocated to give the best advantage for New Zealand. This includes being able to decide on the distribution of beamtime between beamlines and on the ranking of the New Zealand proposals to each beamline. New Zealand researchers from the nine funding institutions were eligible to apply to the Australian Synchrotron for beamtime. Their applications were first assessed on a merit basis by the Synchrotron's beamline panels and the final selections were made by an Access Committee that was established by the board to make the decisions on applications for beamline access. The members of the Committee were:

Professor Geoff Jameson, Massey University (Chair)
Professor Vic Arcus, University of Waikato
Dr Vladimir Golovko, University of Canterbury
Associate Professor Geoff Waterhouse, University of Auckland

The Committee met by teleconference throughout the year as required to make their selections. The table at the end of this section of the Annual Report lists the New Zealand researchers who have gained beamline access to the Australian Synchrotron from July 2016 onwards, and where applicable, the funding support provided to them.

Use of the Australian Synchrotron by New Zealand Researchers

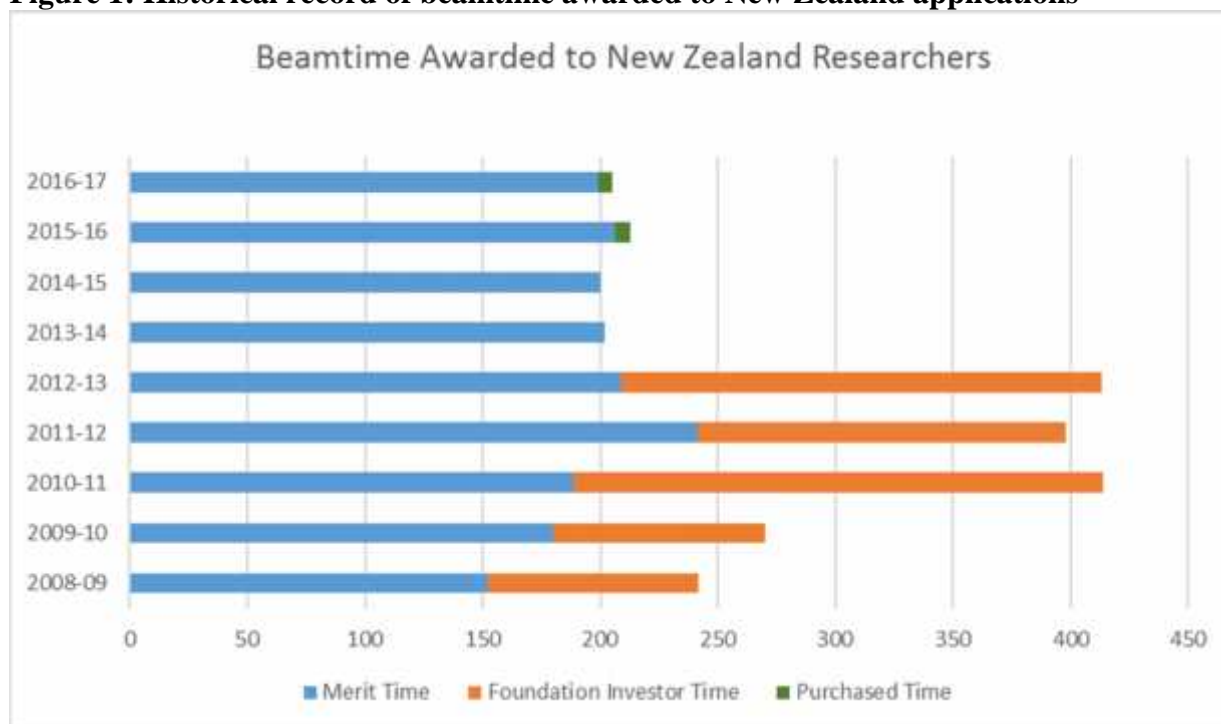
The first of the beamlines was successfully commissioned in mid-2007 and since then all the originally planned beamlines have become operational. Approximately 80% of the available beamline time is assigned to the "merit access" pool and competitive applications are sought from researchers worldwide, including from New Zealand. The Australian Synchrotron makes calls every four months for merit access to the beamlines. Applications are made directly to the Australian Synchrotron, however as explained above, NZSG oversees the ultimate selection of which New Zealand applicants receive beamtime.

Since late 2008, in recognition of the contribution New Zealand makes to operating costs, the Australian Synchrotron began contributing towards the travel costs for New Zealand researchers who obtained beamtime at the Australian Synchrotron on an equal basis with Australian researchers. These funds are administered through NZSG.

Under the access regime introduced at the Synchrotron in 2013 and which operated until June 2017, New Zealand researchers have been entitled to receive 5% of the available beamtime. This is considerably less than was received under the former funding and access regime when through open access to the merit pool of beamtime and guaranteed access to a set amount of Foundation Investor time, New Zealand received approximately 10% of the available time. Figure 1 shows this change in graphical format. New Zealand now receives approximately 200 shifts of beamtime each year. It should however be noted that real access is approximately 50% greater than shown in the graph as a significant number of New Zealand researchers are co-applicants on proposals from Australian colleagues that have been awarded merit beamtime. From July 2017 under the new funding and access arrangements negotiated with ANSTO, New Zealand researchers will obtain 267 merit shifts on the existing

beamlines. Figure 1 also includes shifts purchased by the company in 2015/16 for AUT and in 2016/17 for a multi-institutional group to supplement the merit shifts.

Figure 1: Historical record of beamtime awarded to New Zealand applications



The research community has had to adjust to the reduced level of access. There is now more demand for beamtime and consequently a higher proportion of proposals for beamtime are unsuccessful. This has been compensated for to some extent by increased collaboration between research groups within New Zealand and also with colleagues in Australia. Of 55 applications made by New Zealand researchers for beamtime during the 2016/17 year, only 33 (or 60%) were successful. The applicants had requested 423 beamline shifts and were awarded 199 shifts (47% of that requested).

Table 1: Success Rate for NZ Beamtime Applications – 2016/17*

Beamline	No. Shifts Requested	No. Shifts Awarded		No. Appl'ns. Received	No. Awarded Beamtime	
IMBL	36	15	42%	6	3	50%
IRM	69	33	48%	8	4	50%
PD	69	15	22%	10	2	20%
SAXS	21	15	71%	7	5	71%
SXR	42	42	100%	3	3	100%
THz	0	0	N/A	0	0	N/A
XAS	12	9	75%	3	2	67%
XFM	45	0	0%	4	0	0%
Subtotal	294	154	52%	48	26	54%
MX (CAPs)	129	45	54%	7	7	100%
Overall	423	199	47%	55	33	60%

* A description of the beamlines and the abbreviations used in given on pages 23-24

The following two graphs demonstrate the relatively stable demand for beamtime over the past four years. The greatest demand is for time on the crystallography (MX), the infra-red (IRM) and the small/wide angle x-ray scattering (SAXS) beamlines, although SAXS demand was uncharacteristically low in 2016/17. Others, particularly the soft x-ray absorption spectroscopy (SXR) beamline have also been in demand. One of the new beamlines is a biological small angle scattering (BIOSAXS) beamline. The company has pushed for the early construction of this beamline as it will take some of the pressure off the MX and SAXS beamlines.

Figure 2: Beamtime demand for the past three years

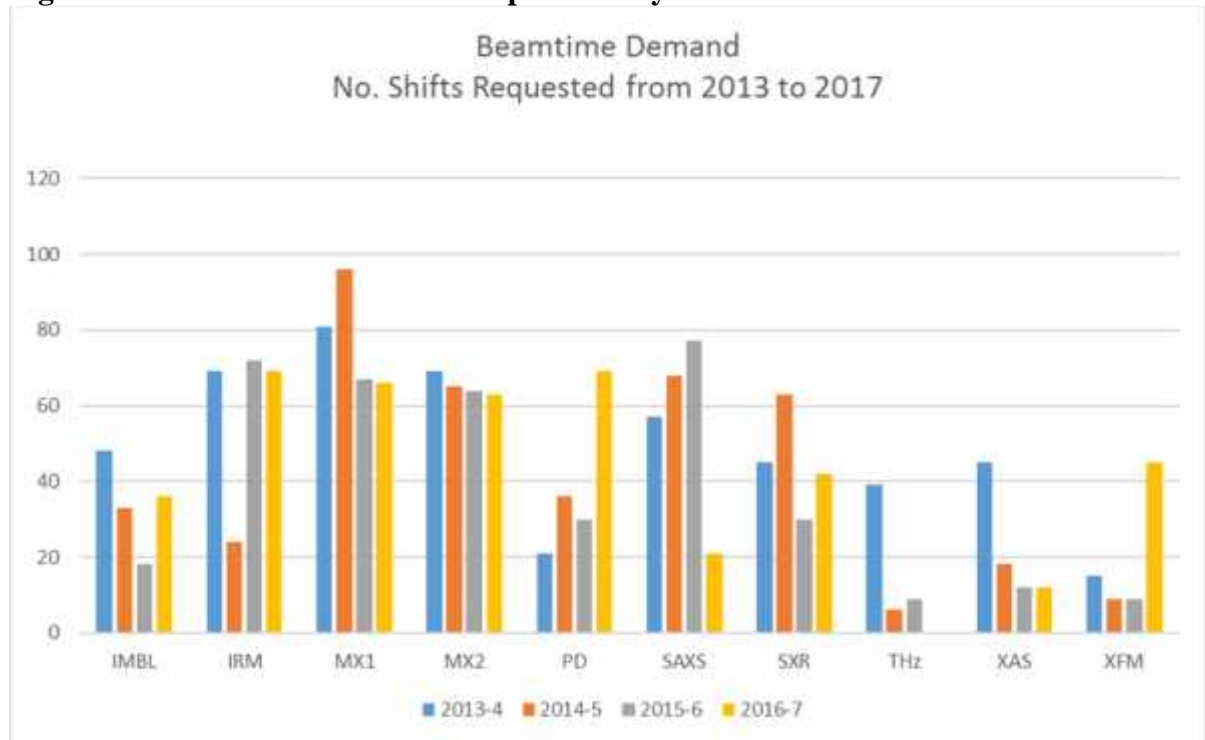
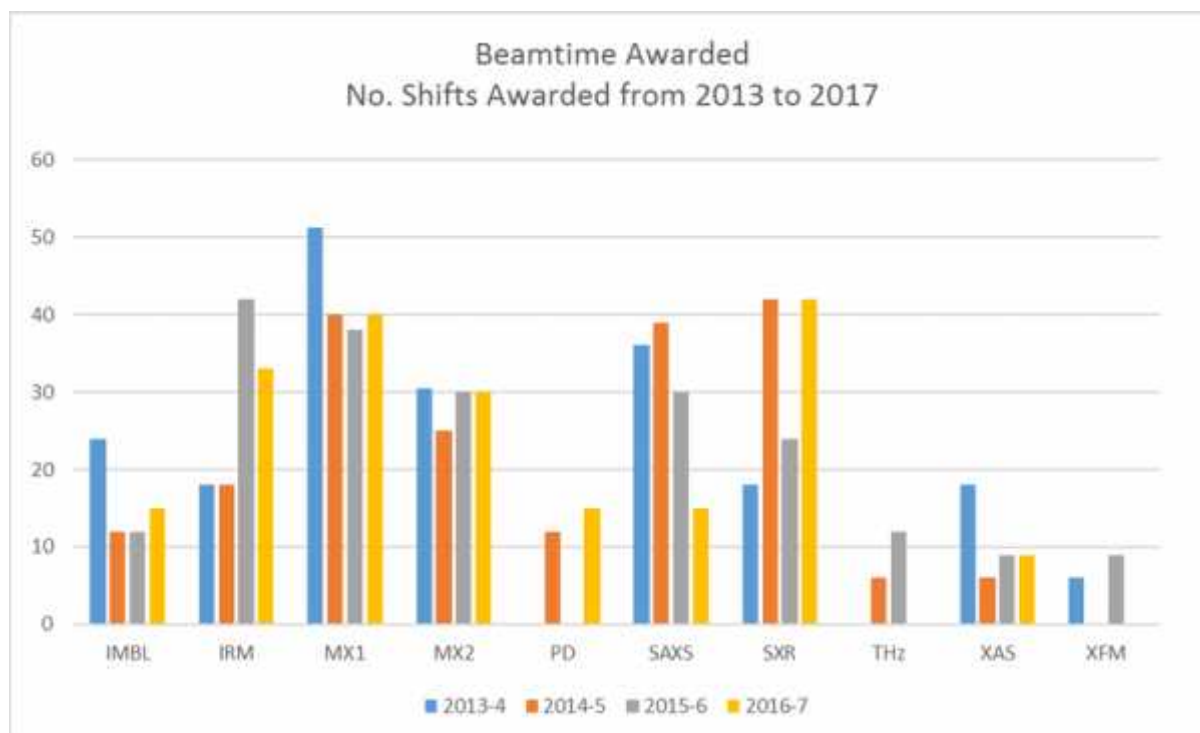


Figure 3: Beamtime awards for the past three years



Science Achievements

A full list of the researchers who received merit beamtime over the past year is given on pages 9 to 17. These projects cover a very broad range of science topics. Many have involved the training of young researchers.

One of the important outputs from any synchrotron is the publication of the research undertaken at the facility in high impact journals. Publication rates from the Australian Synchrotron have been the second highest in the world since its inception and the publication of research by New Zealand users has contributed strongly to that position.

Since 2007 there have been 2,938 publications arising from measurements undertaken at the Australian Synchrotron. New Zealand researchers produced 332 of those publications representing 11.2% of the total. In 2016-17 there were 505 publications arising from the Australian Synchrotron, 49 of which were from New Zealand researchers. New Zealand researcher have produced 9.7% of the publications, which is significantly greater than the 5% of the access received.

A complete list of publications produced during the year is given on pages 18-22.

Support for Synchrotron Scientists

Until 30 June 2009, the company operated the New Zealand Synchrotron Support Programme (NZSSP) with funds originating from the Tertiary Education Commission. With the cessation of that funding, the formal NZSSP has scaled down, but in a large part has been replaced by travel funding available from the Australian Synchrotron which most groups which are access are entitled. NZSG administers these funds. During the year, the company used funds to purchase one additional

period of six shifts of beamtime for a group whose proposal had not been selected but were very close to selection.

In recent years, in addition to funding a number of them to travel to Melbourne to use the Australian Synchrotron, through the associate membership of the Asia Oceania Forum for Synchrotron Radiation Research (AOFSRR), three places had been made available each year for young researchers to attend the Cheiron School at the SPring-8 Synchrotron in Japan. In 2016 it was announced that the Spring-8 Synchrotron would not host any further schools so the AOFSRR arranged for a new similar school to be run by synchrotrons in the region in turn. The first new Asia Oceania Forum Synchrotron Radiation School was held at the Australian Synchrotron in May 2017. The next two schools will be Korea and Thailand.

The table below provides details of the students who were selected to attend the AOF Synchrotron Radiation School in May 2017.

Name	Institution	Details	Comment
Martina Krilova	University of Otago	PhD student	Funded by NZSG
Chanelle Gavin	University of Waikato	Postdoc	Funded by NZSG



D K W Smith
Executive Officer
Secretariat

New Zealand Research Groups Awarded Beamtime (July 2016 – June 2017)

The following New Zealand research groups were awarded merit time at the Australian Synchrotron between July 2016 and June 2017.

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Chris Squire Dr David Goldstone Assoc Prof Peter Metcalf Professor Ted Baker Dr Shaun Lott Assoc Prof Alok Mitra Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2016-2	Micro Crystallography (MX2) “Auckland Structural Biology CAP”	Merit Access 1 day 6-7 July	\$0
Andrea Verolino Prof James White Dr Ian Schipper Rebecca Carey Aaran Murch	Otago Otago VUW Tasmania Univ Otago	2016-2	Imaging and Sensing (IM) “High resolution tomography of ash grains from Surtseyan volcanoes”	Merit Access 1 day 7-8 July	\$2,656
Dr Peter Mace Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day Prof Kurt Krause Rhesa Bodhidarmo	Otago Otago Otago Otago Otago Otago Otago	2016-2	Micro Crystallography (MX2) “University of Otago Structural Biology Group”	Merit Access 1 day 7-8 July	\$1,471
Dr Katie Sizeland Prof Richard Haverkamp Hannah Wells Susyn Kelly Jolin Moral	Austr. Synch Massey Massey Massey Massey	2016-2	Small/Wide Angle X-ray Scattering (SAXS) “Structure and physical properties of collagen materials.”	AS Merit Access 1 day 10-11 July	\$3,066
Dr Geoff Waterhouse Andrew Chan Dr Keith Bambery Wan-Ting Chen Shinji Kihara	Auckland Auckland Austr. Synch. Auckland Auckland	2016-2	Infra-red Microscope (IRM) “An IR microspectroscopic study on the chemical composition of eggshell cross-sections”	Merit Access 3 days 2-5 August	\$1,953
Dr Chris Squire Dr Richard Kingston Dr Jeremy Keown Dr David Goldstone Yuliana Yosaatmadja Marko Zutic Paul Young Mellissa Webby Joy Yang	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2016-2	Small/Wide Angle X-ray Scattering (SAXS) “Investigation of protein folding and antiviral proteins Structural Biology at the University of Auckland”	Merit Access 1 day 4-5 August	\$1,753

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Prof Emily Parker Dr Gillian Norris Dr Andrew Sutherland-Smith Prof Geoff Jameson Prof Vic Arcus Oliver Sterritt	Canterbury Massey Massey Massey Waikato Canterbury	2016-2	Macromolecular Crystallography (MX1) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 5-6 August	\$3,503
Prof Emily Parker Dr Renwick Dobson Dr Grant Pearce Oliver Sterritt Serena Watkin Yifei Fan Yu Bai Chris Horne	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2016-2	Small/Wide Angle X-ray Scattering (SAXS) “University of Canterbury SAXS Collaborative Program”	Merit Access 1 day 5-6 August	\$2,195
Dr Chris Squire Dr David Goldstone Assoc Prof Peter Metcalf Professor Ted Baker Dr Shaun Lott Assoc Prof Alok Mitra Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2016-2	Macromolecular Crystallography (MX1) “Auckland Structural Biology CAP”	Merit Access 1 day 17-18 August	\$0
Dr Peter Mace Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day Prof Kurt Krause Martina Foglizzo	Otago Otago Otago Otago Otago Otago Otago	2016-2	Macromolecular Crystallography (MX1) “University of Otago Structural Biology Group”	Merit Access 1 day 18-19 August	\$1,059
Dr Gillian Norris Dr Bridget Ingham Rafea Naffa Meekyung Ahn	Massey Callaghan Innov. Massey LASRA	2016-2	Small/Wide Angle X-ray Scattering (SAXS) “Fibril architecture in fresh raw and pickled animal skins.”	Merit Access 1 day 20-21 August	\$2,625
Deborah Lau Linda Waters Petronella Nel Emily Noake	CSIRO Te Papa Melbourne U. Melbourne U.	2016-2	Infra-red Microscope (IRM) “Methodological Validation – Can S-FTIR be used to identify oil binding media.”	CSIRO Merit Access 1 day 26-27 August	\$599
Dr Peter Mace Prof Kurt Krause Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day	Otago Otago Otago Otago Otago Otago	2016-3	Macromolecular Crystallography (MX1) “University of Otago Structural Biology Group”	Merit Access 1 day 4-5 October	\$2,404

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Chris Squire Assoc Prof Alok Mitra Assoc Prof Peter Metcalf Dr David Goldstone Professor Ted Baker Dr Shaun Lott Dr Jason Busby Dr Tet Verne Lee Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2016-3	Macromolecular Crystallography (MX1) “Auckland Structural Biology CAP”	Merit Access 2 days 8-9 October 2-3 December	\$2,660
Dr Katie Sizeland Prof Richard Haverkamp Susyn Kelly	Austr. Synch Massey Massey	2016-3	Small/Wide Angle X-ray Scattering (SAXS) “Structure and physical properties of collagen biomaterials”	AS Merit Access 3 days 10-12 October 9-10 December	\$4,515
Emily Parker Prof Geoff Jameson Prof Vic Arcus Dr Gillian Norris Dr Andrew Sutherland-Smith Yu Bai Claire Mullholland Prakash Subedi Bishwa Heng Zhang	Canterbury Massey Waikato Massey Massey Canterbury Waikato Waikato	2016-3	Micro Crystallography (MX2) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 18-19 October	\$3,685
Dr Peter Mace Prof Kurt Krause Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day	Otago Otago Otago Otago Otago Otago	2016-3	Micro Crystallography (MX2) “University of Otago Structural Biology Group”	Merit Access 1 day 29-30 October	\$3,864
Dr Chris Squire Assoc Prof Alok Mitra Assoc Prof Peter Metcalf Dr David Goldstone Professor Ted Baker Dr Shaun Lott Dr Jason Busby Dr Tet Verne Lee Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2016-3	Micro Crystallography (MX2) “Auckland Structural Biology CAP”	Merit Access 1 day 30-31 October	\$1,032
Dr Geoff Waterhouse Andrew Chan Wan-Ting Chen Pei Huan Hsieh Huihua Zhou	Auckland Auckland Auckland Auckland Auckland	2016-3	Soft X-ray Spectroscopy (SXR) “Local electronic structure of nitrogen-doped carbon catalysts for renewable energy applications”	Merit Access 5 days 2-7 November	\$2,332

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Grant Pearce Dr Ren Dobson Prof Emily Parker Serena Watkin Yifei Fan Hamish Cleland William Finnis Yu Bai	Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury Canterbury	2016-3	Small/Wide Angle X-ray Scattering (SAXS) “University of Canterbury SAXS Collaborative Program”	Merit Access 1 day 15-16 Nov	\$2,481
Dr David Goldstone Assoc Prof Shaun Lott Dr Jeremy Keown Eugene (Yunyuan) Sun Dr Jason Busby	Auckland Auckland Auckland Auckland Auckland	2016-3	Small/Wide Angle X-ray Scattering (SAXS) “Investigation of TRIM protein assembly and RHS repeat proteins by Structural Biology at University of Auckland”	Merit Access 1 day 16-17 Nov	\$0
Emily Parker Prof Geoff Jameson Prof Vic Arcus Dr Gillian Norris Dr Andrew Sutherland-Smith	Canterbury Massey Waikato Massey Massey	2016-3	Macromolecular Crystallography (MX1) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 17-18 Nov	\$3,356
Dr Greg Giles Dr Niroshini Manthri Giles Eve Hewitt Samantha McNeill	Otago Otago Otago Otago	2016-3	Infrared Microscope (IRM) “Supramolecular helicates as inducers of autoschizis”	Merit Access 3 days 29 Nov-2 Dec	\$3,275
Assoc Prof Johan Verbeek Chanelle Gavin Dr Mark Lay Anuradha Walallavita	Waikato Waikato Waikato Waikato	2016-3	Infrared Microscope (IRM) “Structural changes induced by foaming thermoplastic proteins and phase distribution of protein biopolymer blends”	Merit Access 2 days 2-4 December	\$2,190
Dr Nanette Schleich Dr Stewart Midgley Marzieh Anjomrouz	Otago Monash Otago	2016-3	Imaging and Sensing (IM) “Spectral CT for pre-clinical brain cancer treatment research”	Merit Access 2 days 8-10 December	\$2,042
Dr Stewart Midgley Dr Nanette Schleich Marzieh Anjomrouz	Monash Otago Otago	2016-3	Imaging and Sensing (IM) “Dosimetry and data corrections for low dose synchrotron computed tomography with large samples at 30-100 keV”	Monash Univ. Merit Access 2 days 10-12 Dec	Incl. in above
Dr Peter Mace Prof Kurt Krause Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day Sarah Trevelyan	Otago Otago Otago Otago Otago Otago Otago	2017-1	Macromolecular Crystallography (MX1) “University of Otago Structural Biology Group”	Merit Access 1 day 22-23 February	\$2,077

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Prof Emily Parker Prof Geoff Jameson Prof Vic Arcus Dr Gillian Norris Dr Andrew Sutherland-Smith Oliver Sterritt Claire Mulholland	VUW Massey Waikato Massey Massey Canterbury Waikato	2017-1	Macromolecular Crystallography (MX1) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 23-24 February	\$7,210
Prof Mary Ryan Dr Bridget Ingham Dr Jiahui Qi Dr Nick Laycock	Imperial Coll. Callaghan Imperial Coll. Qatar Shell	2017-1	Small/Wide Angle X-ray Scattering (SAXS) “Atomic and Nanoscale Investigations of Iron Sulfide Nucleation and Growth at Wet Steel Pipeline Surfaces”	International Merit Access 23-27 February	\$236
Dr Chris Squire Assoc Prof Alok Mitra Assoc Prof Peter Metcalf Dr David Goldstone Professor Ted Baker Dr Shaun Lott Dr Jason Busby Dr Tet Verne Lee Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri Ngoc Anh Thu Ho Anders Jorgensen	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2017-1	Micro Crystallography (MX2) “Auckland Structural Biology CAP”	Merit Access 1 day 26-27 February	\$1,747
Dr Katie Sizeland Prof Richard Haverkamp Dr Hannah Wells Stephanie Gunn Susyn Kelly Keira Nesdale	Austr. Synch. Massey Massey Massey Massey Massey	2017-1	Small/Wide Angle X-ray Scattering (SAXS) “Structure of collagen in urea and lanolin treated skin for cosmetic applications”	Austr Synch Merit Access 3-5 March	\$3,124
Dr Richard Haverkamp Dr Katie Sizeland Dr Hannah Wells Susyn Kelly Prof Ann Mari Svensson Gøril Jahrsengene	Massey Austr. Synch. Massey Massey Norway Norway	2017-1	X-ray Scattering (XAS) “Speciation of metals in anodes for aluminium production from high sulfur cokes”	Merit Access 7-9 March	\$2,161

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Chris Squire Assoc Prof Alok Mitra Assoc Prof Peter Metcalf Dr David Goldstone Professor Ted Baker Dr Shaun Lott Dr Jason Busby Dr Tet Verne Lee Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri Jeremy Keown Michael Barnett	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2017-1	Macromolecular Crystallography (MX1) “Auckland Structural Biology CAP”	Merit Access 2 days 15-16 March 6-7 April	\$3,567
Assoc Prof Tilo Soehnel Natalija Vyborna Daniel Jeremy Wilson Dana Goodacre	Auckland Auckland Auckland Auckland	2017-1	Powder Diffraction (PD) “Powder diffraction studies on Sn based spinel phases”	Merit Access 3 days 16-19 March	\$1,492
Dr Ian Schipper Dr Ben Kennedy Jack Whattam	VUW Canterbury VUW	2017-1	Imaging and Medical (IM) “Textural controls on effusive and explosive rhyolite magma.”	Merit Access 2 days 25-27 March	\$2,661
Prof Emily Parker Prof Geoff Jameson Prof Vic Arcus Dr Gillian Norris Dr Andrew Sutherland-Smith	VUW Massey Waikato Massey Massey	2017-1	Micro Crystallography (MX2) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 25-26 March	Incl. with claim for 23-24 Feb
Dr Peter Mace Prof Kurt Krause Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day Jodie Brewster Wayne Patrick Adam Middleton	Otago Otago Otago Otago Otago Otago Otago Otago Otago	2017-1	Micro Crystallography (MX2) “University of Otago Structural Biology Group”	Merit Access 1 day 31 Mar – 1 Apr	\$3,692
Assoc Prof Ren Dobson Prof Emily Parker Dr Grant Pearce Effie Fan Yu Bai Serena Watkins Chris Horne	Canterbury VUW Canterbury Canterbury Canterbury Canterbury Canterbury	2017-1	Small/Wide Angle X-ray Scattering (SAXS) “University of Canterbury SAXS Collaborative Program”	Merit Access 1 day 31 Mar – 1 Apr	\$2,671
Dr Virginia Toy Martina Kirilova Jack Williams	Otago Otago Otago	2017-1	Infrared Microscope (IRM) “Identifying the source of graphite in the New Zealand’s Alpine Fault rocks”	Merit Access 2 days 5-7 April	\$1,879

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Ian Schipper Prof James White Aaron Murch Andrea Verolino	VUW Otago Otago Otago	2017-1	Infrared Microscope (IRM) “Magmatic volatile evolution in two of Earth's most significant submarine eruptions: Surtsey and Havre Seamount”	NZSG Paid Access 2 days 7-9 April	\$3,443
Dr Grant McIntosh Prof Jim Metson Prof Margaret Hyland Hasini Wijayaratne Gordon Agbenyegah Andrew Chan	Auckland Auckland Auckland Auckland Auckland	2017-1	Soft X-ray Scattering (SXR) “Evolution of the surface chemistry of smelter and catalytic grade aluminas during calcination and fluoride adsorption”	Merit Access 4 days 26-30 April	\$2,495
Assoc Prof Martin Allen Prof Roger Reeves Dr Rodrigo Gozoni Alexandra McNeill Adam Hyndman Jomty Scott	Canterbury Canterbury Canterbury Canterbury Canterbury	2017-2	Soft X-ray Scattering (SXR) “Origin and modification of the quantised electron accumulation layers on tin dioxide surfaces”	Merit Access 5 days 13-18 June	Claim not received yet
Dr Peter Mace Prof Kurt Krause Dr Joel Tyndall Dr Sigurd Wilbanks Prof Greg Cook Prof Catherine Day Brook Hayes Dr Yoshio Nakatani	Otago Otago Otago Otago Otago Otago Otago	2017-2	Micro Crystallography (MX2) “University of Otago Structural Biology Group”	Merit Access 1 day 20-21 June	\$2,699
Dr Chris Squire Assoc Prof Alok Mitra Assoc Prof Peter Metcalf Dr David Goldstone Professor Ted Baker Dr Shaun Lott Dr Jason Busby Dr Tet Verne Lee Dr Richard Kingston Prof Juliet Gerrard Dr Ghader Bashiri Dr Aimee Son	Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland Auckland	2017-2	Macromolecular Crystallography (MX1) “Auckland Structural Biology CAP”	Merit Access 2 days 22-23 June 19-20 July	\$1,322
Prof Emily Parker Prof Geoff Jameson Prof Vic Arcus Dr Gillian Norris Dr Andrew Sutherland-Smith Oliver Sterritt Heng Zhang Claire Mulholland Yu Bai	VUW Massey Waikato Massey Massey Canterbury Waikato Waikato Canterbury	2017-2	Micro Crystallography (MX2) “Protein Structure and Function: Waikato, Canterbury and Massey Universities”	Merit Access 1 day 23-24 June	\$2,748

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Adrian Pittari Elham Yousefzadeh	Waikato Waikato	2017-2	Imaging and Medical Beamline (IM) “Texture analysis of ignimbrite matrix to assess the particle framework of pyroclastic flows”	Merit Access 1 day 27-28 June	\$1,530
Prof Brian Monaghan Dr Bridget Ingham Dr Chris Brumby Dr Vlatko Materic Dr Ray Longbottom Dr Martin Ryan Nohamad Nusheh Sigit Prabowo	Wollongong Callaghan VUW Callaghan Wollongong Callaghan VUW VUW	2017-2	Powder Diffraction (PD) “Hydrogen reduction of New Zealand titanomagnetite ironsand”	Wollongong U Merit Access 3 days 29 Jun – 2 Jul	\$2,223
Dr Shane Telfer David Perl	Massey Massey	2016-3 to 2017-2	Macromolecular Crystallography (MX1) “Partially Interpenetrated Metal-organic Frameworks”. Project in Monash University led CAP “Chemical Crystallography for Functional Molecules, Complexes and Materials”	Merit Access 1 shift Various dates	N/A
Dr Shane Telfer David Perl	Massey Massey	2016-3 to 2017-2	Micro Crystallography (MX2) “Partially Interpenetrated Metal-organic Frameworks”. Project in Monash University led CAP “Chemical Crystallography for Functional Molecules, Complexes and Materials”	Merit Access 1 shift Various dates	N/A
Prof Paul Kruger David Young Rob Staniland Dr Chris Fitchett Shane Verma Dr Jas Ward Prof Peter Steel	Canterbury	2016-3 to 2017-2	Macromolecular Crystallography (MX1) “Spin-Crossover Materials, Spin Clusters and Metal Organic Frameworks”. Project in Monash University led CAP “Chemical Crystallography for Functional Molecules, Complexes and Materials”	Merit Access 1 shift Various dates	N/A
Dr Grant Pearce Serena Watkin Cameron McDonald	Canterbury Canterbury Canterbury	2016-3 to 2017- 2	Macromolecular Crystallography (MX1) “Evolution of quaternary structure in lysine biosynthesis.” Project in University of Melbourne led CAP “Macromolecular complexes for FRED (Fibrils, Receptors, Enzymes, DNA)”	Merit Access 1 shifts Various dates	N/A

Researchers	Institution	Cycle	Beamline	Access	Travel Funding
Dr Grant Pearce Serena Watkin Cameron McDonald	Canterbury Canterbury Canterbury	2016-3 to 2017- 2	Micro Crystallography (MX2) “Evolution of quaternary structure in lysine biosynthesis.” Project in University of Melbourne led CAP “Macromolecular complexes for FRED (Fibrils, Receptors, Enzymes, DNA)”	Merit Access 1 shift Various dates	N/A
Dr Renwick Dobson Christopher Horne Dr Rachel North Dr Michael Griffin	Canterbury Canterbury Canterbury Melbourne U.	2016-3 to 2017- 2	Macromolecular Crystallography (MX1) “Bacterial sialic acid import, catabolism and gene regulation: from structure to function to regulation to inhibition.” Project in University of Melbourne led CAP “Macromolecular complexes for FRED (Fibrils, Receptors, Enzymes, DNA)”	Merit Access 1 shifts Various dates	N/A
Dr Renwick Dobson Dr Rachel North Christopher Horne Dr Michael Griffin	Canterbury Canterbury Canterbury Melbourne U.	2016-3 to 2017- 2	Micro Crystallography (MX2) “Bacterial sialic acid import, catabolism and gene regulation: from structure to function to regulation to inhibition.” Project in University of Melbourne led CAP “Macromolecular complexes for FRED (Fibrils, Receptors, Enzymes, DNA)”	Merit Access 3 shifts Various dates	N/A

Journal Publications from New Zealand Researchers (July 2016 – June 2017)

Author	Year of Pub	Title	Journal	Volume	Pages
H.C. Wells, G. Holmes, R.G. Haverkamp	2016	Looseness in bovine leather: microstructural characterization	Journal of the Science of Food and Agriculture	96	2731-2736
Ho Yeung, Christopher J. Squire, Yuliana Yosaatmadja, Santosh Panjekar, Gemma López, Antonio Molina, Edward N. Baker, Paul W. R. Harris, Margaret A. Brimble	2016	Radiation Damage and Racemic Protein Crystallography Reveal the Unique Structure of the GASA/Snakin Protein Superfamily	Angew. Chem.-Int. Edit.	55	7930-7933
Conor C. Horgan, Alexandra L. Rodriguez, Rui Li, Kiara F. Bruggeman, Nicole Stupka, Jared K. Raynes, Li Day, John W. White, Richard J. Williams, David R. Nisbet	2016	Characterisation of minimalist co-assembled fluorenylmethoxycarbonyl self-assembling peptide systems for presentation of multiple bioactive peptides	Acta Biomater.	38	Nov-22
Hannah C. Wells, Geoff Holmes, U-ser Jeng, Wei-Ru Wu, Nigel Kirby, Adrian Hawley, Stephen Mudie, Richard G. Haverkamp	2017	A small angle X-ray scattering study of the structure and development of looseness in bovine hides and leather	Journal of the Science of Food and Agriculture	97	1543-1551
Sizeland, Katie H., Wells, Hannah C., Edmonds, Richard L., Kirby, Nigel, Haverkamp, Richard G	2016	The Effect of Tanning Agents on Collagen Structure and Response to Strain in Leather	J. Am. Leather Chem. Assoc.	111	391-397
Emma K. Livingstone, Gerd Mittelstadt, Fiona M. Given, Emily J. Parker	2016	Independent catalysis of the short form HisG from <i>Lactococcus lactis</i>	FEBS Lett.	590	2603-2610
B. Ingham, A. Smialowska, G. D. Erlangga, L. Matia-Merino, N. M. Kirby, C. Wang, R. G. Haverkamp, A. J. Carr	2016	Revisiting the interpretation of casein micelle SAXS data	Soft Matter	12	6937-6953
Ali Reza Nazmi, Eric J.M. Lang, Yu Bai, Timothy M. Allison, Mohamad H. Othman, Santosh Panjekar, Vickery L. Arcus, Emily J. Parker	2016	Interdomain Conformational Changes Provide Allosteric Regulation En Route To Chorismate	J. Biol. Chem.	291	21836-21847
Tatiana P. Soares da Costa, Sebastien Desbois, Con Dogovski, Michael A. Gorman, Natalia E. Ketaren, Jason J. Paxman, Tanzeela Siddiqui, Leanne M. Zammit, Belinda M. Abbott, Roy M. Robins-Browne, Michael W. Parker, Geoffrey B. Jameson, Nathan E. Hall, Santosh Panjekar, Matthew A. Perugini	2016	Structural Determinants Defining the Allosteric Inhibition of an Essential Antibiotic Target	Structure	24	1282-1291
Jeremy Russell Keown, David Charles Goldstone	2016	Crystal structure of the Trim5 Bbox2 domain from rhesus macaques describes a plastic oligomerisation interface	J. Struct. Biol.	195	282-285

Author	Year of Pub	Title	Journal	Volume	Pages
Foglizzo M, Middleton AJ, Day CL.	2016	Structure and Function of the RING Domains of RNF20 and RNF40, Dimeric E3 Ligases that Monoubiquitylate Histone H2B.	J. Mol. Biol.	428	4073-4086
Gerd Mittelstädt, Gert-Jan Moggré, Santosh Panjkar, Ali Reza Nazmi, Emily J. Parker	2016	Campylobacter jejuniadenosine triphosphate phosphoribosyltransferase is an active hexamer that is allosterically controlled by the twisting of a regulatory tail	Protein Sci.	25	1492-1506
Muhammad Hanif, Sally Moon, Matthew P. Sullivan, Sanam Movassaghi, Mario Kubanik, David C. Goldstone, Tilo Söhnle, Stephen M.F. Jamieson, Christian G. Hartinger	2016	Anticancer activity of Ru- and Os(arene) compounds of a maleimide-functionalized bioactive pyridinecarbothioamide ligand	J. Inorg. Biochem.	165	100-107
A. Auer, J.D.L. White, M.J. Tobin	2016	Variable H ₂ O content in magmas from the Tongariro Volcanic Centre and its relation to crustal storage and magma ascent	J. Volcanol. Geoth. Res.	325	203-210
N. Amy Yewdall, Hariprasad Venugopal, Ambroise Desfosses, Vahid Abrishami, Yuliana Yosaatmadja, Mark B. Hampton, Juliet A. Gerrard, David C. Goldstone, Alok K. Mitra, Mazdak Radjainia	2016	Structures of Human Peroxiredoxin 3 Suggest Self-Chaperoning Assembly that Maintains Catalytic State	Structure	24	1120-1129
Ehab N.M. Jirgis, Ghader Bashiri, Esther M.M. Bulloch, Jodie M. Johnston, Edward N. Baker	2016	Structural Views along the Mycobacterium tuberculosis MenD Reaction Pathway Illuminate Key Aspects of Thiamin Diphosphate-Dependent Enzyme Mechanisms	Structure	24	1167-1177
Mohammad Younus, Richard N. Prentice, Andrew N. Clarkson, Ben J. Boyd, Shakila B. Rizwan	2016	Incorporation of an Endogenous Neuromodulatory Lipid, Oleoylethanolamide, into Cubosomes: Nanostructural Characterization	Langmuir	32	8942-8950
Lisa Buddrus, Emma S. V. Andrews, David J. Leak, Michael J. Danson, Vickery L. Arcus, Susan J. Crennell	2016	Crystal structure of pyruvate decarboxylase from Zymobacter palmae	Acta Crystallogr. F	72	700-706
Saifang Huang, Ying Li, Shanghai Wei, Zhaohui Huang, Wei Gao, Peng Cao	2017	A novel high-strength lithium disilicate glass-ceramic featuring a highly intertwined microstructure	J. Eur. Ceram. Soc.	37	1083-1094
Kayed, H. R., Sizeland, K. H., Wells, H. C., Kirby, N., Hawley, A., Mudie, S. T. and Haverkamp, R. G.	2016	Age Differences with Glutaraldehyde Treatment in Collagen Fibril Orientation of Bovine Pericardium	J. Biomater. Tiss. Eng.	6	992-997
Nigel Kirby, Nathan Cowieson, Adrian M. Hawley, Stephen T. Mudie, Duncan J. McGillivray, Michael Kusel, Vesna Samardzic-Boban, Timothy M. Ryan	2016	Improved radiation dose efficiency in solution SAXS using a sheath flow sample environment	Acta Crystallogr. Sect. D	72	1254-1266

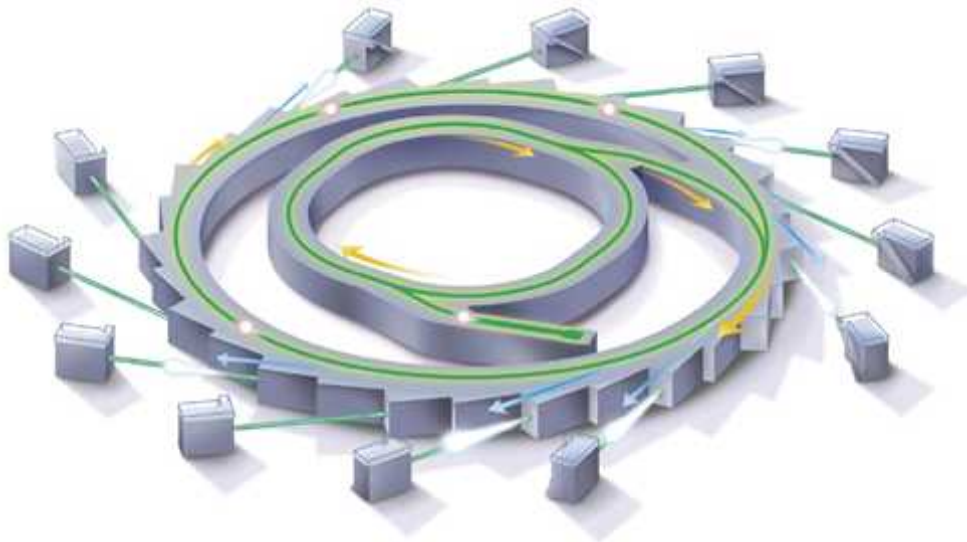
Author	Year of Pub	Title	Journal	Volume	Pages
Jiaxin Lian, Bradley W. Mansel, Bridget Ingham, Sujay Prabakar, Martin A. K. Williams	2017	Controlling chain flexibility in collagen networks to produce hydrogels with distinct properties	Soft Mater.	15	145-152
Hannah C. Wells, Katie H. Sizeland, Sue M. Cooper, Nigel Kirby, Adrian Hawley, Stephen Mudie, Richard G. Haverkamp	2017	Deer leather: analysis of the microstructure affecting pebble	Journal of the Science of Food and Agriculture	97	3509-3514
Joel D. A. Tyndall, Manya Sabherwal, Alia A. Sagatova, Mikhail V. Keniya, Jacopo Negroni, Rajni K. Wilson, Matthew A. Woods, Klaus Tietjen, Brian C. Monk	2016	Structural and Functional Elucidation of Yeast Lanosterol 14 -Demethylase in Complex with Agrochemical Antifungals	PLoS ONE	11	e0167485
Alexandra R. McNeill, Adam R. Hyndman, Roger J. Reeves, Alison J. Downard, Martin W. Allen	2016	Tuning the Band Bending and Controlling the Surface Reactivity at Polar and Nonpolar Surfaces of ZnO through Phosphonic Acid Binding	ACS Appl. Mater. Interfaces	8	31392-31402
A. M. Hyland, R. A. Makin, S. M. Durbin, M. W. Allen	2017	Giant improvement in the rectifying performance of oxidized Schottky contacts to ZnO	J. Appl. Phys.	121	24501
Jodi L. Brewster, James L. O. McKellar, Thomas J. Finn, Janet Newman, Thomas S. Peat, Monica L. Gerth	2016	Structural basis for ligand recognition by a Cache chemosensory domain that mediates carboxylate sensing in <i>Pseudomonas syringae</i>	Sci. Rep.	6	35198
James N. Blaza, Hannah R. Bridges, David Aragão, Elyse A. Dunn, Adam Heikal, Gregory M. Cook, Yoshio Nakatani, Judy Hirst	2017	The mechanism of catalysis by type-II NADH:quinone oxidoreductases	Sci. Rep.	7	40165
J. Kennedy, F. Fang, J. Futter, J. Leveneur, P.P. Murmu, G.N. Panin, T.W. Kang, E. Manikandan	2017	Synthesis and enhanced field emission of zinc oxide incorporated carbon nanotubes	Diam. Relat. Mater.	71	79-84
Janni B. Christensen, T. P. Soares da Costa, Pierre Faou, F. Grant Pearce, Santosh Panjekar, Matthew A. Perugini	2016	Structure and Function of Cyanobacterial DHDPS and DHDPR	Sci. Rep.	6	37111
Hassan S. Al Qahtani, Rintaro Higuchi, Takayoshi Sasaki, Jason F. Alvino, Gregory F. Metha, Vladimir B. Golovko, Rohul Adnan, Gunther G. Andersson, Tomonobu Nakayama	2016	Grouping and aggregation of ligand protected Au ₉ clusters on TiO ₂ nanosheets	RSC Adv.	6	110765-110774
Michael Petridis, Chelsea Vickers, Jennifer Robson, Joanna L. McKenzie, Magdalena Bereza, Abigail Sharrock, Htin Lin Aung, Vickery L. Arcus, Gregory M. Cook	2016	Structure and Function of AmtR in <i>Mycobacterium smegmatis</i> : Implications for Post-Transcriptional Regulation of Urea Metabolism through a Small Antisense RNA	J. Mol. Biol.	428	4315-4329
Rachel A. North, Andrew J. A. Watson, F. Grant Pearce, Andrew C. Muscroft-Taylor, Rosmarie Friemann, Antony J. Fairbanks, Renwick C. J. Dobson	2016	Structure and inhibition of N-acetylneuraminatase lyase from methicillin-resistant <i>Staphylococcus aureus</i>	FEBS Lett.	590	4414-4428

Author	Year of Pub	Title	Journal	Volume	Pages
Timothy A. Ablott, Marc Turzer, Shane G. Telfer, Christopher Richardson	2016	High Temperature Postsynthetic Rearrangement of Dimethylthiocarbamate-Functionalized Metal–Organic Frameworks	Cryst. Growth Des.	16	7067-7073
Emma L. Summers, Christina D. Moon, Renee Atua, Vickery L. Arcus	2016	The structure of a glycoside hydrolase 29 family member from a rumen bacterium reveals unique, dual carbohydrate-binding domains	Acta Crystallogr. F	72	750-761
Joshua D. Wright, Peter D. Mace, Catherine L. Day	2016	Noncovalent Ubiquitin Interactions Regulate the Catalytic Activity of Ubiquitin Writers	Trends Biochem. Sci.	41	924-937
Yi Zhang, Bridget Ingham, Jérôme Leveueur, Soshan Cheong, Yin Yao, David J. Clarke, Geoff Holmes, John Kennedy, Sujay Prabakar	2017	Can sodium silicates affect collagen structure during tanning? Insights from small angle X-ray scattering (SAXS) studies	RSC Adv.	7	11665-11671
Saifang Huang, Zhaohui Huang, Peng Cao, Zoran Zujovic, Jason R. Price, Maxim Avdeev, Meidan Que, Furitsu Suzuki, Tsuyoshi Kido, Xin Ouyang, Hironori Kaji, Minghao Fang, Yan-gai Liu, Wei Gao, Tilo Söhnel	2017	114-Type Nitrides LnAl(Si _{4-x} Al _x)N ₇ O with Unusual [AlN ₆] Octahedral Coordination'	Angew. Chem.-Int. Edit.	56	3886-3891
Hanna Kwon, Paul G. Young, Christopher J. Squire, Edward N. Baker	2017	Engineering a Lys-Asn isopeptide bond into an immunoglobulin-like protein domain enhances its stability	Sci. Rep.	7	42753
Johannes F. Weijman, Abhishek Kumar, Sam A. Jamieson, Chontelle M. King, Tom T. Caradoc-Davies, Elizabeth C. Ledgerwood, James M. Murphy, Peter D. Mace	2017	Structural basis of autoregulatory scaffolding by apoptosis signal-regulating kinase 1	P. Natl. Acad. Sci. U.S.A.	114	E2096-E2105
Amy Y. Xu, Laurence D. Melton, Timothy M. Ryan, Jitendra P. Mata, Geoffrey B. Jameson, Agata Rekas, Martin A. K. Williams, Duncan J. McGillivray	2017	Sugar-coated proteins: the importance of degree of polymerisation of oligo-galacturonic acid on protein binding and aggregation	Soft Matter	13	2698-2707
Matthew P. Sullivan, Michael Groessel, Samuel M. Meier, Richard L. Kingston, David C. Goldstone, Christian G. Hartinger	2017	The metalation of hen egg white lysozyme impacts protein stability as shown by ion mobility mass spectrometry, differential scanning calorimetry, and X-ray crystallography	Chem. Commun.	53	4246-4249
A. Smialowska, L. Matia-Merino, B. Ingham, A.J. Carr	2017	Effect of calcium on the aggregation behaviour of caseinates	Colloid. Surf. A	522	113-123
Hassan S. Al Qahtani, Gregory F. Metha, Rick B. Walsh, Vladimir B. Golovko, Gunther G. Andersson, Tomonobu Nakayama	2017	Aggregation Behavior of Ligand-Protected Au ₉ Clusters on Sputtered Atomic Layer Deposition TiO ₂	J. Phys. Chem. C	121	10781-10789
Wasinee Phonsri, David S. Macedo, Kuduva R.	2017	Halogen Substitution Effects on N ₂ O Schiff Base	Chem.-Eur. J.	23	7052-7065

Author	Year of Pub	Title	Journal	Volume	Pages
Vignesh, Gopalan Rajaraman, Casey G. Davies, Guy N. L. Jameson, Boujemaa Moubaraki, Jas S. Ward, Paul E. Kruger, Guillaume Chastanet, Keith S. Murray		Ligands in Unprecedented Abrupt FeII Spin Crossover Complexes			
Wasinee Phonsri, Phimphaka Harding, Lujia Liu, Shane G. Telfer, Keith S. Murray, Boujemaa Moubaraki, Tamsyn M. Ross, Guy N. L. Jameson, David J. Harding	2017	Solvent modified spin crossover in an iron(iii) complex: phase changes and an exceptionally wide hysteresis	Chem. Sci.	8	3949-3959
Felix W. von Aulock, Ben M. Kennedy, Anton Maksimenko, Fabian B. Wadsworth, Yan Lavallée	2017	Outgassing from Open and Closed Magma Foams	Front. Earth Sci.	5	46
P. G. Young, Y. Yosaatmadja, P. W. R. Harris, I. K. H. Leung, E. N. Baker and C. J. Squire	2016	Harnessing ester bond chemistry for protein ligation	Chemical Communications	53	1502-1505
Dedeepya Uppalapati, Ben Boyd, Jadranka Travas Sejdic, Darren Svirskis	2017	Porous conducting polymer prepared through liquid crystal template for drug delivery	Int. J. Nanotechnol.	14	422-431

Australian Synchrotron

A synchrotron is a large research facility that generates an extremely intense beam of electromagnetic radiation ('light') that can be used for scientific experiments. The radiation is produced by taking a stream of electrons travelling at close to the speed of light, and deflecting them with magnetic fields. The light covers the electromagnetic spectrum from the infrared to the hard x-ray region.



Electrons are generated in the linear accelerator (linac), and progress into the smaller 'booster' ring, where they are further accelerated up to their final velocity (99.99% of the speed of light, a kinetic energy of 3.0 GeV). At this point they are 'injected' into the larger storage ring, where they circulate for a period of hours to days. The electron beam is steered and focused by magnetic fields. At each point where the beam is deflected, electromagnetic radiation is produced tangential to the beam path. 'Insertion devices', undulators and wigglers, are periodic magnet structures that serve to increase the radiation flux by up to five orders of magnitude. The radiation produced can be used in many different experiments and techniques. The light is channelled from the ring down a number of 'beam lines', each of which is optimised for a particular experimental technique.

The status of the various beam lines at the Australian Synchrotron can be summarised as follows:

-) Protein crystallography (MX1) was the first beam line to become operational and began accepting general users in January 2008. This technique uses x-ray diffraction to determine the structure of proteins, used in drug design and understanding biochemical interactions.
-) Infrared spectroscopy and microscopy (IR) also came online in early 2008. The beam line features two endstations: an FTIR spectrometer (THz) and an infrared microscope (IRM).
-) Powder diffraction (PD) began taking general users in February 2008 and was fully operational by May 2008. This beam line is a general purpose diffraction beam line with several sample environments for observing changes in materials structure as a function of temperature, pressure, time, etc.

-) The soft x-ray absorption spectroscopy (SXR) beamline was available for general users from the September-December 2008 cycle. It operates at low x-ray energies and is most useful for surface studies.
-) Final commissioning of the X-ray absorption spectroscopy (XAS) beam line was completed at the end of 2008 and became available to general users from January 2009. This technique is useful for probing elemental valence states and determining the local structure around an atomic species of interest.
-) Small-angle x-ray scattering (SAXS), combined with wide-angle x-ray scattering (WAXS) is a useful technique for determining large scale (1-100 nm), short-range order in materials. This beam line came online at the beginning of 2009.
-) The commissioning of the second protein crystallography and small-molecule crystallography beamline (MX2) was completed in mid 2009. It complements the existing protein crystallography beam line and is able to measure micron-sized crystals and other weakly-scattering or hard to crystallise systems.
-) The microspectroscopy beam line (XFM) construction was also completed in early 2009. This beamline combines the high spatial resolution of a microscope with the information that can be gleaned through x-ray fluorescence spectroscopy.
-) The medical imaging and therapy beam line (IMBL) is has only recently come into full use. It was redesigned from its original concept. The redesign involved a 150 m long enclosure being built which extends well outside the synchrotron building.



The New Zealand Synchrotron Group was one of ten foundation investors, each of whom has contributed A\$5 million towards the initial suite of beam lines. This investment secured preferred (as-of-right) access for each foundation investor, spread over all the beam lines in addition to unrestricted access to the merit beamtime pool. The preferred access arrangements for foundation investors ceased in August 2013.

With the completion of the initial suite of nine beamlines, thoughts turned to the possibility of adding new beamlines to expand the facilities capabilities. The Australian Synchrotron consulted with the research communities in Australia and New Zealand and a Science Case to add a further 10 beamlines and make other upgrades to the facility was published in July 2010. Consideration of this Case was set aside while arrangements were made to secure operating funding from the Australian Commonwealth and the Victorian State Governments and the other Foundation Investors. In 2013 an updated development plan, called “Bright”, describing 7 new beamlines was published. New Zealand has been offered the opportunity to contribute to the development, thereby securing long-term access for New Zealand researchers to the enhanced facility.

The ownership of the Synchrotron and responsibility for its operation changed with effect from 1 July 2016. The Victorian government and the minor shareholders agreed to transfer their shares to ANSTO which now own the Synchrotron on behalf of the Commonwealth government. The Commonwealth government also committed to provide 10 years operating funding for the facility and to provide future increases in the operating funding to meet higher costs associated with the operation of the new beamlines.

The Commonwealth has offered New Zealand the opportunity to continue participating in the Synchrotron. A government to government arrangement has been signed that establishes the right for New Zealand researchers to have access to the Australian Synchrotron. The directors believe the formal country-to-country agreement will give shareholders greater influence than the previous minority shareholding position, and therefore the confidence to continue participating in the sector-wide partnership with the government to fund ongoing access to the facility.

NZSG initially negotiated a funding and access agreement with ANSTO that maintained the 5% access level until 30 June 2019 in return for an annual contribution of A\$1.5 million towards the facility's operating costs. The New Zealand government provided half the cost of access, the remainder came from the research sector. However, during the past year ANSTO launched a campaign to fund seven or eight new beamlines at the Synchrotron. The company has been able to negotiate a new long-term arrangement with ANSTO that gives a 33% increase in the proportion of merit beamtime that New Zealand researchers will be able to access on the Synchrotron and a guaranteed share of both merit and preferred access time on the new beamlines as they are built. In addition, ANSTO have agreed to commence construction of the new BioSAXS within the first two years and to consult with the company on the order of construction of the other beamlines. New Zealand is to contribute A\$12 million towards the cost of the new beamlines and pay an annual access fee of A\$1.5 million, (plus a minor cost of living increase from 2019/20 onwards). The New Zealand government will provide half the cost of access with the remainder coming from the research sector.

CORPORATE GOVERNANCE

Board Composition

The company operates with a board comprising of 5 directors, including an independent chairman. Interim directors were appointed initially. These were replaced by a permanent board following elections which were held in April 2007.

The Directors during the period 1 July 2016 to 30 June 2017 were:

Dr Garth Carnaby, Chair
Professor Geoffrey Jameson, Massey University
Professor Michael McWilliams, CSIRO
Professor James Metson, The University of Auckland
Professor Ian Shaw, University of Canterbury

Indemnities and Insurance

The board has taken Directors and Officers Liability Insurance with Lumley General Insurance Limited. Coverage of up to \$5 million has been obtained.

Attendance at Board Meetings

The following table shows the attendance at meetings of the board for each director and the fees paid.

Director	No. meetings held during the year	No. meetings attended	Fees paid
Dr Garth Carnaby	5	4	\$9,000
Professor Geoffrey Jameson	5	5	-
Professor Michael McWilliams	5	5	-
Professor James Metson	5	5	-
Professor Ian Shaw	5	4	-

Donations

The company did not make any donations during the period from establishment up to 30 June 2017.

Interests Register

During the course of undertaking its normal business activities in supporting the development of synchrotron science, the company provides assistance towards the travel costs for research staff from its shareholders. The practice at meetings of the board is for directors from organisations who are receiving financial support to declare an interest and to refrain from voting on that particular matter.

The following significant entries relating to the directors were recorded in the Interests Register during the year.

Director	Organisation/Entity	Nature of Interest	
Dr GA Carnaby			
Shares Held	GA Carnaby & Associates Ltd	Controlling majority	
Beneficiary of Trusts	Carnaby Trust	Trustee and discretionary beneficiary	
Offices Held	National Provident Fund	Annuity/Defined benefit	
	Canterbury Development Corporation	Chair	
	Canterbury Economic Development Trustee Ltd	Chair	
	NZ Food Innovation (South Island) Ltd	Chair	
	Lincoln University	Chair, Research & Commercialisation Committee	
	Dodd-Walls Centre of Research Excellence	Chair	
	BioResource Processing Alliance	Chair	
	Seed Research Centre, Lincoln Univ.	Chair	
	Wool Industry Research Ltd	Chair, Science Advisory Board	
	NZ Food Innovation Network	Director	
Prof GB Jameson			
Shares Held	Tower Ltd	Minority shareholder	
Beneficiary of Trusts	Estate of MEB Jameson	Discretionary beneficiary	
Offices Held	Massey University	Employee	
Other Interests	Te Manawa Museums Trust Board	Board member	
Prof MO McWilliams			
Offices Held	CSIRO	Employee	
Prof JB Metson			
Shares Held	Vector Energy	Minority shareholder	
Offices Held	University of Auckland	Deputy Vice-Chancellor Research	
	Brain Research New Zealand	Board Member	
	Maurice Wilkins Centre for Molecular Biodiscovery	Board Member	
	Medical Technologies Centre of Research Excellence	Board Member	
	Te Pūnaha Matatini	Board Member	
	Dodd Walls Centre	Board Member	
	Ngā Pae o te Maramatanga	Board Member	
	High Value Nutrition National Science Challenge	Board Member	
	A Better Start National Science Challenge	Board Member	
	Auckland UniServices Ltd	Director	
	Other Interests	Australian Synchrotron	Chair, Science Advisory Committee

Director	Organisation/Entity	Nature of Interest
Prof IC Shaw		
Offices Held	University of Canterbury	Employee
Other Interests	Sandoz GmbH, Austria	Consultant
	New Zealand Pharmaceuticals	Consultant

**New Zealand Synchrotron Group
Limited**

Financial Statements

for the year ended 30 June 2017

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Directors

G A Carnaby
G B Jameson
M O McWilliams
J B Metson
I C Shaw

Registered Office

11 Turnbull Street
Thorndon
Wellington

Nature of business

The purpose of the company is to provide research access in the Australian Synchrotron for researchers from New Zealand. The company also promotes synchrotron science, assists in the capability of New Zealand researchers in synchrotron science and manages the travel funding for New Zealand researchers using the Australian Synchrotron.

Company Registration number

1865516

Independent auditor

Office of the Auditor General with assistance from
PricewaterhouseCoopers

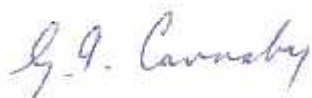
New Zealand Synchrotron Group Limited
Board Report
for the year ended 30 June 2017

The Board has pleasure in presenting the annual report of the New Zealand Synchrotron Group Limited ("NZSG") incorporating the financial statements and the auditors' report, for the year ended 30 June 2017.

The Company has taken advantage of the reporting concessions available to it under sections 211(3) of the Companies Act 1993.

The Board of NZSG has authorised these financial statements presented on pages 7 to 18 for issue on 20 October 2017.

For and on behalf of the Board



.....
Garth Carnaby
Chair

20-Oct-17

.....
Date



.....
Mike McWilliams
Director

20-Oct-17

.....
Date



Independent Auditor's Report to the readers of New Zealand Synchrotron Group Limited's Financial Statements for the year ended 30 June 2017

The Auditor-General is the auditor of New Zealand Synchrotron Group Limited (the Company). The Auditor-General has appointed me, Chris Ussher, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the Company on his behalf.

Opinion

We have audited:

- the financial statements of the Company on pages 7 to 18, that comprise the statement of financial position as at 30 June 2017, the statement of comprehensive revenue and expenses, statement of changes in net assets and statement of cash flows for the year ended on that date and the notes to the financial statements that include significant accounting policies and other explanatory information; and

In our opinion:

- the financial statements of the Company on pages 7 to 18:
 - present fairly, in all material respects:
 - its financial position as at 30 June 2017; and
 - its financial performance and cash flows for the year then ended;
 - comply with generally accepted accounting practice in New Zealand in accordance with Public Benefit Entities Standards Reduced Disclosure Regime.

Our audit was completed on 20 October 2017. This is the date at which our opinion is expressed.

The basis for our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities relating to the financial statements, we comment on other information, and we explain our independence.

Basis for our opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the Professional and Ethical Standards and the International Standards on Auditing (New Zealand) issued by the New Zealand Auditing and Assurance Standards Board. Our responsibilities under those standards are further described in the Responsibilities of the auditor section of our report.

We have fulfilled our responsibilities in accordance with the Auditor-General's Auditing Standards. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of the Board of Directors for the financial statements

The Board of Directors is responsible on behalf of the Company for preparing financial statements that are fairly presented and that comply with generally accepted accounting practice in New Zealand.

The Board of Directors is responsible for such internal control as it determines is necessary to enable it to prepare financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible on behalf of the Company for assessing the Company's ability to continue as a going concern. The Board of Directors is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting, unless the Board of Directors intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so. The Board of Directors' responsibilities arise from the Crown Entities Act 2004 and the Education Act 1989.

Responsibilities of the auditor 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 auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit carried out in accordance with the Auditor-General's Auditing Standards will always detect a material misstatement when it exists. Misstatements are differences or omissions of amounts or disclosures, and can arise from fraud or error. Misstatements are considered material if, individually or in the aggregate, they could



reasonably be expected to influence the decisions of readers taken on the basis of these financial statements.

We did not evaluate the security and controls over the electronic publication of the financial statements.

As part of an audit in accordance with the Auditor-General's Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. Also:

- We 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 control.
- We obtain an understanding of internal control 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 control.
- We evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors.
- We conclude on the appropriateness of the use of the going concern basis of accounting by the Board of Directors 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 auditor's 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 auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- We evaluate the overall presentation, structure and content of the financial, 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 Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit. Our responsibilities arise from the Public Audit Act 2001.

Other information

The Board of Directors is responsible for the other information. The other information comprises the information included on pages 3 to 4, but does not include the financial statements, and our auditor's report thereon.

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

In connection with our audit of the financial statements, our responsibility is to read the other information. In doing so, we 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 our work, 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.

Independence

We are independent of the Company in accordance with the independence requirements of the Auditor-General's Auditing Standards, which incorporate the independence requirements of Professional and Ethical Standard 1 (Revised): *Code of Ethics for Assurance Practitioners* issued by the New Zealand Auditing and Assurance Standards Board. Other than the audit, we have no relationship with or interests in the Company.

Chris Ussher
On behalf of the Auditor-General
Wellington, New Zealand

PricewaterhouseCoopers

New Zealand Synchrotron Group Limited
Statement of comprehensive revenue and expenses
for the year ended 30 June 2017

	2017	2017	2016
	Unaudited	Actual	Actual
	budget		
Note	\$	\$	\$
Revenue from non exchange transactions			
Revenue for Australian Operations	3	1,792,273	1,754,362
			1,705,507
Revenue from exchange transactions			
Revenue for NZ Operations	4	120,000	120,000
Other revenue	4	175,227	-85,957
			107,972
Total Revenue		<u>2,087,500</u>	<u>1,788,405</u>
			<u>1,928,357</u>
Expenses			
Australian Synchrotron Group costs		1,704,545	1,608,118
Other operating expenses	6	382,955	278,859
			460,508
Operating expenditure		<u>2,087,500</u>	<u>1,886,977</u>
			<u>1,941,398</u>
Total surplus/(deficit) for the year		<u>-</u>	<u>(98,572)</u>
			<u>(13,042)</u>
Other comprehensive income		-	-
			-
Total comprehensive revenue and expense		<u><u>-</u></u>	<u><u>(98,572)</u></u>
			<u><u>(13,042)</u></u>

These financial statements should be read in conjunction with the accompanying notes on pages 11 - 18

New Zealand Synchrotron Group Limited
Statement of changes in net assets
for the year ended 30 June 2017

	Notes	Share capital \$	Retained earnings \$	Total equity \$
Balance as at 30 June 2015		2,824,036	(2,313,477)	510,559
Net deficit		-	(13,042)	(13,042)
Other comprehensive income		-	-	-
Total comprehensive revenue and expenses		-	(13,042)	(13,042)
Contributions from owners	15	88,126	-	88,126
Balance as at 30 June 2016		2,912,162	(2,326,519)	585,643
Net surplus		-	(98,572)	(98,572)
Other comprehensive income		-	-	-
Total comprehensive revenue and expenses		-	(98,572)	(98,572)
Balance as at 30 June 2017		2,912,162	(2,425,090)	487,072

These financial statements should be read in conjunction with the accompanying notes on pages 11 - 18

New Zealand Synchrotron Group Limited
Statement of financial position
as at 30 June 2017

ASSETS	Note	2017	2016
		\$	\$
<i>Current assets</i>			
Cash and cash equivalents	7	496,382	367,751
Trade and other receivables	8	12,370	50,664
Derivative financial instruments	9	11,248	194,555
Total current assets		520,000	612,970
		<hr/>	<hr/>
TOTAL ASSETS		520,000	612,970
 LIABILITIES			
<i>Current liabilities</i>			
Trade and other payables	11	16,110	27,327
Derivative financial instruments		16,818	-
Total current liabilities		32,928	27,327
		<hr/>	<hr/>
TOTAL LIABILITIES		32,928	27,327
		<hr/>	<hr/>
Net assets		\$ 487,072	\$ 585,643
 EQUITY			
Share capital	15	2,912,162	2,912,162
Retained earnings		(2,425,090)	(2,326,519)
TOTAL EQUITY		\$ 487,072	\$ 585,643
		<hr/>	<hr/>

For and on behalf of the Board



.....
Garth Carnaby
Chair

Date: 20 October 2017



.....
Mike McWilliams
Director

Date: 20 October 2017

These financial statements should be read in conjunction with the accompanying notes on pages 11 - 18

New Zealand Synchrotron Group Limited
Statement of cash flows
for the year ended 30 June 2017

	Notes	2017 \$	2016 \$
<i>Cash flows from operating activities</i>			
<u>Receipts</u>			
Receipts from non exchange transactions		1,754,362	1,705,507
Receipts from exchange transactions		257,667	156,803
Interest	4	14,794	21,460
Net cash flows from operating activities		2,026,824	1,883,770
<u>Payments</u>			
Australian Synchrotron Group Costs		(1,619,334)	(1,466,820)
Less: Cash applied to Derivative Asset		0	(153,524)
Other expenses		(278,859)	(435,950)
Total cash applied		(1,898,194)	(2,056,294)
Net cashflows from operating activities	17	128,631	(172,524)
 <i>Cash flows from financing activities</i>			
<u>Receipts</u>			
Contributions from shareholders		-	88,126
Net cash flows from financing activities		-	88,126
Net (decrease)/increase in cash and cash equivalents		128,631	(84,398)
Cash and cash equivalents at 1 July	7	367,751	452,149
Cash and cash equivalents at 30 June	7	496,382	367,751

These financial statements should be read in conjunction with the accompanying notes on pages 11 - 18

Note 1. General information

New Zealand Synchrotron Group Limited ("the Company" or "NZSG") was incorporated on 13 September 2006. The Company is a Public Sector Public Benefit Entity. The purpose of the Company is to provide research access to the Australian Synchrotron for researchers from New Zealand. In addition, the Company also promotes synchrotron science, assists the development of capability of New Zealand researchers in synchrotron science and manages the travel funding for New Zealand researchers using the Australian Synchrotron. It has twelve shareholders who are all either New Zealand universities, Crown Research Institutes or Crown Entities. The company is managed by a five person board elected by the shareholders, including an independent Chair. The Chair receives remuneration; the other directors do not. The Royal Society of New Zealand has been contracted to provide secretariat services to the Board.

The Company's revenue consists of fees paid by both shareholders and the Ministry of Business Innovation and Employment ("MBIE") to provide support services and funds provided by the Australian Synchrotron for travel funding grants. Its registered office is 11 Turnbull Street, Thorndon, Wellington.

The financial statements are prepared on a going concern basis. The Company has entered into agreements for future access to the Australian Synchrotron up until 30 June 2026.

The Board will authorise the financial statements on 20 October 2017

Note 2. Significant accounting policies

(a) Basis of preparation

The financial statements of the Company have been prepared in accordance with Generally Accepted Accounting Practice in New Zealand (NZ GAAP). They comply with Public Benefit Entity Standards Reduced Disclosure Regime (PBE Standards RDR) and authoritative notices that are applicable to entities that apply PBE Standards.

The Company is eligible and has elected to report in accordance with Tier 2 PBE Standards RDR on the basis that the Company has no public accountability and is not large as defined in XRB A1. The Directors have elected to report in accordance with Tier 2 PBE Accounting Standards and in doing so have taken advantage of all applicable Reduced Disclosure Regime ("RDR") disclosure concessions.

The significant accounting policies adopted in the preparation of the financial statements are set out below. These policies have been consistently applied to all the periods presented, unless otherwise stated.

Statutory base

New Zealand Synchrotron Group Limited ("NZSG" or the "Company") is a company registered under the Companies Act 1993.

The financial statements have been prepared in accordance with the Financial Reporting Act 2013.

Basis of measurement

These financial statements have been prepared under the historical cost convention, as modified by the revaluation of financial instruments at fair value through surplus or deficit.

(b) Changes in accounting policy

There have been no changes in accounting policy.

(c) Foreign currency translation

Functional and presentational currency

The financial statements are presented in New Zealand dollars, which is the Company's functional and presentation currency. Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of comprehensive revenue and expenses.

(d) Revenue recognition

Revenue from exchange transactions comprises the fair value for the sale of goods and services, excluding Goods and Services Tax, rebates and discounts. Revenue is recognised when services are rendered.

(e) Interest income

Interest income is recognised on a time proportion basis using the effective interest method. When a receivable is impaired, NZSG reduces the carrying amount to its recoverable amount, being the estimated future cash flow discounted at the original effective interest rate of the instrument, and continues unwinding the discount as interest income. Interest income on impaired loans is recognised using the rate of interest used to discount the future cash flows for the purpose of measuring the impairment loss.

(f) Government grants, sponsorships and donations

Government grants and non-government grants are recognised as revenue when they become receivable unless there is an obligation to return the funds if conditions of the grant are not met. If there is such an obligation, the grants are initially recorded as grants received in advance and recognised as revenue when conditions of the grant are satisfied.

(g) Income Tax

From 1 July 2009 the NZSG has been granted a Tax Exemption under Section CW49 of the Income Tax Act 2007. As a consequence NZSG will have no ongoing liability for Income Tax.

(h) Goods and Services Tax (GST)

The statement of comprehensive revenue and expenses has been prepared so that all components are stated exclusive of GST. All items in the statement of financial position are stated net of GST, with the exception of receivables and payables, which include GST invoiced.

(i) Cash and cash equivalents

Cash and cash equivalents includes cash on hand, deposits held at call with financial institutions, and other short term highly liquid investments with original maturities of three months or less, that are readily convertible to known amounts of cash, and which are subject to an insignificant risk of changes in value.

(j) Trade receivables

Trade receivables are recognised initially at fair value and subsequently measured at amortised cost, less provision for doubtful debts.

The recoverability of trade receivables is reviewed on an ongoing basis. Debts which are known to be uncollectible are written off. A provision for doubtful receivables is established when there is objective evidence that NZSG will not be able to collect all amounts due according to the original terms of receivables. The amount of the provision is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the effective interest rate. The amount of the provision is recognised in the statement of comprehensive revenue and expenses.

(k) Derivative financial instruments

Derivatives are categorised as financial assets and liabilities held for trading. Derivatives are initially recognised at fair value on the date a derivative contract is entered into and are subsequently re-measured at their fair value. Gains and losses arising from changes in the fair value of the derivative financial instruments are presented in the statement of comprehensive income and expenses within gain/(loss) on fair value of derivatives. The fair value of derivative financial instruments are determined by using valuation techniques. Valuation techniques used include the use of comparable recent arm's length transactions, reference to other instruments that are substantially the same, option pricing models and other valuation techniques commonly used by market participants making the maximum use of market inputs and relying as little as possible on entity-specific inputs.

(l) Investments and other financial assets

NZSG classifies its investments in the following categories: loans and receivables. The classification depends on the purpose for which the investments were acquired. Management determines the classification of its investments at the initial recognition and re-evaluates this designation at every reporting date.

Loans and receivables are non derivative financial assets with fixed or determinable payments that are not quoted in an active market. They arise when NZSG provides money, goods or services directly to a debtor with no intention of selling the receivable. They are included in current assets, except for those with maturities greater than 12 months after the balance sheet date which are classified as non current assets. 'Trade and other receivables' and 'cash and cash equivalents' are classified as loans and receivables in the statement of financial position.

Loans and receivables are subsequently carried at amortised cost using the effective interest method.

(m) Trade and other payables

These amounts represent liabilities for goods and services provided to NZSG prior to the end of financial year which are unpaid. The amounts are unsecured and are usually paid within 30 days of recognition. Trade and other payables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method.

(n) Sponsorship and donations expense

Through the ordinary course of its activities the Company provides sponsorships and makes donations to advance its stated objectives. The Company recognises a liability for this expenditure when the recipient meets any eligibility criteria attached to a sponsorship or donation agreement.

(o) Statement of Cash Flows

The following are the definitions of the terms used in the Statement of Cash Flows:

- i) Cash is considered to be cash on hand, cash in transit, bank accounts and deposits with a maturity of no more than 3 months from the date of acquisition;
- ii) Investing activities are those relating to acquisition, holding and disposal of investment in ASHC and investments not falling within the definition of cash;
- iii) Financing activities are those activities which result in changes in the size and composition of the capital structure of the Company. This includes equity, debt not falling within the definition of cash.

All other activities are classified as operating activities.

Note 3. Revenue for Australian operations	2017	2016
	\$	\$
<i>Revenue from non-exchange transactions</i>		
Ministry of Business Innovation and Employment	940,000	983,000
Shareholders	814,362	722,507
<i>Revenue from exchange transactions</i>		
	-	-
	<u>1,754,362</u>	<u>1,705,507</u>

The Company receives support from the Government and shareholders for Australian Synchrotron costs.

Note 4. Revenue for New Zealand operations	2017	2016
	\$	\$
<i>(a) Revenue from non-exchange transactions</i>		
	-	-
<i>Revenue from exchange transactions</i>		
Grants from shareholders for operating costs of NZSG	120,000	114,878
<i>(b) Other Revenue</i>		
Contribution from the Australian Synchrotron towards travel costs	99,374	90,420
(Loss)/Gain on fair value of Derivative instrument	(200,125)	(3,908)
Interest	14,794	21,460
	<u>(85,957)</u>	<u>107,972</u>
	<u>34,043</u>	<u>222,850</u>

Note 5. Australian Synchrotron Group costs

As detailed in note 10(a) the Company makes an annual contribution to the ongoing operating costs of the Australian Synchrotron.

Note 6. Included in other operating costs
(a) Remuneration of auditor

During the year the following fees were paid or payable for services provided by the Auditor General appointed auditor - PricewaterhouseCoopers.	2017	2016
	\$	\$
Statutory audit services	7,750	7,750
	<u>7,750</u>	<u>7,750</u>

(b) Foreign exchange (gains) / losses

During the year the following exchange (gains) / losses were made on transactions between New Zealand and Australia.

	2017	2016
	\$	\$
Foreign exchange (gains) / losses	55	(4,431)
	<u>55</u>	<u>(4,431)</u>

New Zealand Synchrotron Group Limited
Notes to the financial statements
for the year ended 30 June 2017

(c) Support for Synchrotron Science

During the year the following fees were paid or payable for services provided.

	2017	2016
	\$	\$
Travel costs reimbursed to related parties	102,089	109,345
Payments for access to Australian Synchrotron	36,433	48,948
Grant to Australian Synchrotron for new detector.	0	167,224
User Meetings	7,659	4,528
Asia Oceania Forum for Synchrotron Radiation Research Membership	4,423	14,314
	<u>150,604</u>	<u>344,358</u>

(d) Secretariat and other operating costs

During the year the following fees were paid or payable for services provided.

	2017	2016
	\$	\$
Secretariat services from the Royal Society and Board costs	108,102	100,637
Preparation New Funders agreement	8,751	-
Insurance	2,950	2,950
Other	646	382
	<u>120,450</u>	<u>103,969</u>
Total other operating costs	<u>278,859</u>	<u>460,508</u>

Note 7. Cash and cash equivalents

	2017	2016
	\$	\$
Cash	361,494	327,954
Foreign currency - AUD	134,888	39,797
	<u>496,382</u>	<u>367,751</u>

All the bank balances are held with the Bank of New Zealand.

Note 8. Trade and other receivables

	2017	2016
	\$	\$
Trade receivables	6,150	49,189
Prepayments	1,475	1,475
Goods and Services Tax receivable	4,745	-
Total trade and other receivables	<u>12,370</u>	<u>50,664</u>

New Zealand Synchrotron Group Limited
Notes to the financial statements
for the year ended 30 June 2017

Note 9. Derivative financial instruments

	2017	2016
	\$	\$
Western Union Forward cover	(5,570)	194,555
Derivative financial instruments	(5,570)	194,555

The following derivatives have been entered into with Western Union.

(a) *Forward foreign exchange contracts*

The notional principal amounts of the outstanding forward exchange contracts at 30 June 2017 were \$0; (2016: \$792,812) and \$806,018; (2016: \$0). At 30 June 2017, the fair value amounted to \$(16,818) (2016: \$6,607).

(b) *Options*

At 30 June 2016	Notional	Strike Price	Fair Value
Forward foreign exchange option (Maturity: February 2017)	\$852,273	0.88	\$65,678
Forward foreign exchange option (Maturity: February 2018)	\$852,273	0.88	\$62,325
Forward foreign exchange option (Maturity: February 2019)	\$852,273	0.88	\$59,945
At 30 June 2017	Notional	Strike Price	Fair Value
Forward foreign exchange option (Maturity: February 2018)	\$852,273	0.88	\$2,068
Forward foreign exchange option (Maturity: February 2019)	\$852,273	0.88	\$9,180

Note 10. Commitments

(a) *Agreement with Australian Nuclear Science and Technology Organisation (ANSTO)*

Agreements have been signed on the 17th June 2016, between NZSG and ANSTO Ltd whereby NZSG undertakes to provide AUD4.5m over three years in return for 5% of the access. As part of the Funders' Agreement entered into with 9 of the shareholders, these funds will be received directly from the Participants or MBIE on their behalf when required to fulfil these obligations. New Zealand shareholders who are party to the Funders' Agreement are irrevocably committed to contribute a total of AUD2,250,000 (GST exclusive) evenly over a 3 year period.

(b) *Agreement with MBIE*

The company has entered into a 3 year agreement with the Ministry of Business, Innovation and Employment for Crown Funding totalling NZ\$2.820m over the period 1 July 2016 to 30 June 2019.

Note 11. Trade and other payables

	2017	2016
	\$	\$
Creditors	-	3,888
Accruals	16,110	23,439
Goods and Services Tax payable	-	-
Total trade and other payables	16,110	27,327

The amount owed to related parties was nil as at 30 June 2017. (2016: nil).

Note 12. Contingent liabilities

There were no significant contingent liabilities at 30 June 2017. (2016: nil)

Note 13. Related parties

Related parties comprise of the shareholders identified in Note 15. There have been a number of related party transactions during the year ended 30 June 2017.

These transactions include grants from shareholders as per Note 4 and for operating and travel costs reimbursed as per note 6.

Note 14. Events occurring after balance date

NZSG entered into 3 new contracts in July and August 2017 which replaced the contracts signed with ANSTO, MBIE and the Funders the previous year. The new contracts extend the funding and access period to the Australian Synchrotron from June 2019 to June 2026, and describe the mechanism by which NZSG will acquire funding each year from MBIE and the research sector for both a contribution to the construction of new beamlines at the Synchrotron and an annual access payment to ANSTO and the terms on which New Zealand researchers will receive access to the existing and new beamlines at the Synchrotron in return for making those payments to ANSTO. These include an increase in the level of access to both the existing and the new beamlines from 5% of the available beamtime to 6.639%.

In August 2017 NZSG purchased additional forward cover for the MBIE-funded half of the A\$1,500,000 payment to be made to ANSTO in February 2019. A deposit of \$82k was paid. Also in August 2017, a further vanilla option maturing in February 2020 for A\$5.8 million at a strike rate of 0.85 was taken to protect against any dramatic fall in the New Zealand dollar during the first years of the new agreements with ANSTO. The total cost of this cover was \$260k.

Note 15. Share capital

Shareholding at cost	2017	2016
	\$	\$
The University of Auckland	509,217	509,217
The University of Waikato	190,357	190,357
Massey University	428,317	428,317
Victoria University of Wellington	237,966	237,966
University of Canterbury	285,546	285,546
Lincoln University	28,557	28,557
Otago University Holdings Ltd	285,546	285,546
AgResearch Ltd	285,546	285,546
Institute of Geological and Nuclear Sciences Ltd	190,357	190,357
The New Zealand Institute for Plant and Food Research Ltd	190,357	190,357
Callaghan Innovation	192,270	192,270
Auckland University of Technology	88,126	88,126
	<u>2,912,162</u>	<u>2,912,162</u>

The shares held at 30 June are:

	2017	2016
	# of shares held	# of shares held
The University of Auckland	436,319	436,319
The University of Waikato	163,104	163,104
Massey University	367,001	367,001
Victoria University of Wellington	203,897	203,897
University of Canterbury	244,668	244,668
Lincoln University	24,467	24,467
Otago University Holdings Ltd	244,668	244,668
AgResearch Ltd	244,668	244,668
Institute of Geological and Nuclear Sciences Ltd	163,104	163,104
The New Zealand Institute for Plant and Food Research Ltd	163,104	163,104
Callaghan Innovation	163,104	163,104
Auckland University of Technology	163,104	163,104
	<u>2,581,208</u>	<u>2,581,208</u>

The amount recognised in the balance sheet as paid in capital is the New Zealand dollar equivalent at the date of issue.

New Zealand Synchrotron Group Limited
Notes to the financial statements
for the year ended 30 June 2017

Note 16. Financial instruments

Classification of financial assets by category	Fair value through Profit or Loss	Loans and Receivables
2017	\$	\$
Cash and cash equivalents	-	496,382
Trade & other receivables	-	12,370
Derivative financial instrument	11,248	-
Total	11,248	508,752
2016		\$
Cash and cash equivalents	-	367,751
Trade & other receivables	-	49,189
Derivative financial instrument	194,555	-
Total	194,555	416,940

Classification of financial liabilities by category

Measured at amortised cost

	2017	2016
	\$	\$
Trade & other payables	16,110	27,327
Derivative financial instrument	16,818	-
Total	32,928	27,327

Note 17. Reconciliation of profit with cash flows from operating activities

	2017	2016
	\$	\$
Net (Deficit)/Surplus for the year	(98,572)	(13,042)

Movement in working capital

Trade and other receivables	38,294	(44,089)
Derivative financial instruments	200,125	(125,059)
Trade and other payables	(11,217)	9,666
Net Cash outflow from operating activities	128,631	(172,524)