It gives me great pleasure to commend to you the Monash University Accident Research Centre Annual Report for 2017, marking the Centre's 30th Anniversary.

In October 2017 I had the pleasure of speaking at MUARC's 30-year anniversary event at the Melbourne Museum Theatre which focused on a vision of an injury free society. The calibre of guests at this public forum spoke volumes about MUARC's importance to the key agencies who have come to benefit so greatly from the Centre's world-class research.

As I highlighted on that evening, Monash is a university that pursues excellence and aims to extend the boundaries of knowledge. MUARC epitomises this pursuit. Its ability not only to make a real and observable difference in the world, but to do so over a sustained 30-year period, and in the face of significant challenges, such as the decline of the car manufacturing industry, is inspirational.

MUARC's achievements over the last three decades have had a significant and enduring influence on safety and injury prevention. In this report you will read about the Centre's extensive program of research and training through 2017, which is changing safety practices, preventing injuries and saving lives in our communities.

The Traffic Engineering and Vehicle Safety group has completed an important collaboration on the future of private transport at a critical time where autonomous vehicles promise many safety benefits but raise just as many questions. The team brought together a multidisciplinary consortium from across the University to consider future transport challenges and opportunities from legal, ethical, environmental and safety perspectives.

The Behavioural Science for Transport Safety team has made significant progress in its research on child passenger safety, older drivers and bicycle safety, delivering recommendations with the potential to save the lives of our most vulnerable road users.

The Human Factors in Transport and Workplace Safety team undertook a range of research across road safety, mining, injury outcomes and return-to-work areas. The Team completed a major project for the Commonwealth Department of Defence which provided critical information to improve communications and leadership within army teams.

The Regulation and In-depth Crash Investigation team continued its work on the TAC-funded Enhanced Crash Investigation Study, which will provide vital information on contributing factors in different road crash types to support new road safety strategies.

2017 marked the 25th annual publication of the Used Car Safety Ratings, a publication produced through the research efforts of the Centre's Injury Analysis and Data Team. The booklet provides consumers with a comprehensive guide on the safety of any used vehicle they might wish to purchase.

The Victorian Injury Surveillance Research Unit produced two e-bulletins providing overviews of Victoria's injury and injury-related death profile. Findings highlighted the top three sources of injury deaths were falls, suicide and transport – accounting for approximately three quarters of all injury deaths in the state for the period 2013–2015. The focus of the Unit's influential Hazard publication this year was on intentional injury, which profiled recent trends in suicide deaths, self-harm injury, and assault injury and deaths in Victoria.

In partnership with Women's Health initiatives in North East Victoria, the Disaster Resilience group commenced important research efforts to understand the capacity of communities to recover from disasters and what contributes to sustained resilience over the longer term. This work is funded through the National Disaster Resilience Scheme.

Responding to continuing strong demand, the Road Safety Management Leadership Program offered two programs in 2017 which attracted a broad range of senior people from transport agencies from across Australia and internationally.

In other capacity building efforts, the Centre joined with Victoria Police in co-hosting a World Health Organization-sponsored delegation of Pacific Islander senior police in a three-day speed and drug enforcement training program.

MUARC's Graduate Research Program also continues to contribute to the academic culture of the Centre with students participating in the Centre's research seminar program, national and international conferences and publications in high-quality scientific journals.

A sincere congratulations to the Centre's academic and professional staff on their many excellent achievements this year and across a long and distinguished 30-year history. MUARC's work is highly valued by the University and plays a crucial role in saving lives around the world.

I would like to take this opportunity to bid farewell to MUARC as I retire from the University in March 2018. It has been a privilege to work with the Centre and witness its achievements over the last six years.

I wish MUARC all the best for the next 30 years.
ABOUT MUARC

The Monash University Accident Research Centre (MUARC) is one of the world’s most comprehensive injury prevention research institutions.

We are grounded in scientific and academic excellence, while producing research with real-life implications that translate readily into policy and practice – whether it’s understanding contributing factors to older pedestrian falls, studying community preparedness and recovery in the event of a disaster or comparing year-by-year trends in crash-worthiness of the private motor vehicle fleet.

MUARC is the home to many vital Monash researchers and groups. Because of the breadth of our research, we have a strong national profile and an international reputation that is growing in prominence.

The Centre identifies emerging injury problems, monitors progress, determines and evaluates solutions and advises government and industry on safety strategies. We encourage our experts to actively collaborate in solving pressing, practical problems – this allows our external partners access to expertise across their fields of interest. Our research is interdisciplinary and applies a systems framework to address injury prevention needs across three main settings:

- Home and community safety
- Workplace safety
- Transport safety

We have already made Australia – and Australians – safer. Now we are harnessing MUARC’s global perspective and experience to help meet the challenges of public health around the world through international collaborative projects, graduate student mentoring and leadership training across Europe, North America, the Middle East, South Africa and Asia.

We also make significant contributions to capacity building and injury prevention initiatives in the Western Pacific Region through our status as a World Health Organization Collaborating Centre for Violence and Injury Prevention. With our colleagues across Monash, we support and promote the principles of the United Nations’ Sustainable Development Goals and we are proud to contribute to the global network which strives to bring practical solutions for achieving safe, sustainable and resilient communities.
RESEARCH AWARDS

In 2017, the researchers and research groups within the Monash University Accident Research Centre were rewarded for their outstanding work with a variety of honours, grants and other noteworthy opportunities.

We also celebrated the 30th anniversary of MUARC’s establishment throughout the year. Those celebrations culminated in a public event held in October.

The Mary Fran Myers Award

Debra Parkinson, an Adjunct Research Fellow with the Monash University Disaster Resilience Initiative, was the joint winner of the 2017 Mary Fran Myers Award, which was presented in Boulder, Colorado.

The award was established in 2002 by the Gender and Disaster Network and its first recipient was the co-director of the Natural Hazards Center at the University of Colorado, Mary Fran Myers. She died at the age of just 52 in 2004 and the award is now named in her honour. It recognises that “vulnerability to disasters and mass emergencies is influenced by social, cultural and economic structures that marginalise women and girls” and recognises research which makes progress in this area.

Deb Parkinson was commended for her two decades of research into gender inequity and gendered violence. Between 2009 and 2014, her research with the late Claire Zara focused on environmental justice and the gendered effects of disaster. Claire Zara was the posthumous co-recipient of the award.

Deb Parkinson and Claire Zara’s work with communities affected by the Black Saturday bushfires, completed just before Claire’s sad death in 2015, was particularly groundbreaking.

Interdisciplinary Research

A project involving researchers from across MUARC, representing multiple areas of study, was granted nearly $50,000 in funding in 2017.

The team of Associate Professor Michael Fitzharris, Professor Peter Cameron, Professor Judith Charlton, Professor Mark Fitzgerald and Associate Professor Brett Williams will go ahead with “Improving post-crash survival outcomes by optimising acute emergency care systems” thanks to the funds which were provided by the Monash Interdisciplinary Research Support Scheme.

The initial goal of their work, which will commence in 2018, is to establish a best practice model of post-crash care using Victoria as one example. The second phase of the project will examine the structure, features, processes and patient outcomes in Vietnam, Malaysia, India and Myanmar. The long-term objective will be to develop a research, education and training program.

World Health Organization Internship

Dr Carlyn Muir was the successful applicant for the MUARC World Health Organization (WHO) Internship opportunity for Early Career Researchers in 2017. Dr Muir will contribute to the Regional Action Plan for Violence and Injury Prevention in the Western Pacific.

As part of the project, Dr Muir will map MUARC projects, taking into account their alignment with UN Sustainable Development Goals relating to violence and injury prevention.

The AJ Mirkin Service Award

Professor Brian Fildes received an important prize from the Association for the Advancement of Automotive Medicine (AAAM). The AJ Mirkin Service Award recognises members of the AAAM who have made long-standing contributions through involvement with the committee and projects.

Professor Fildes is a past president of the AAAM.

Vice-Chancellor’s Award

As part of the 30-year commemorations, a small working group prepared a submission for the Vice-Chancellor’s Education and Research Awards. It was titled ‘30 Years of Effective Collaboration: The MUARC Model’. It outlined the Centre’s three decades of leadership in injury prevention research and its success in creating practical solutions to some of the world’s most pressing problems in the discipline.

In November the Office of the Vice-Chancellor announced MUARC as the recipient of the prestigious Vice-Chancellor’s Award for Sustained Excellence in Research Impact and Enterprise.
DIRECTOR’S MESSAGE

It is my great privilege to write this message for the 2017 MUARC Annual Report which highlights not only a year of excellent achievements, but a celebration of three extraordinary decades of research, work and world-changing ideas.

MUARC was established on the 28th of June 1987 as a partnership between the Victorian government and Monash University. At that time, just five staff had “MUARC” on their business cards and yet, as a newly launched Research Centre within the University, MUARC immediately made its presence known. Within a few months, the Centre had given evidence to the Commonwealth government suggesting that significant investment was needed to improve the safety standards in cars. A year later, MUARC played a vital role in the now-legendary TAC campaign ‘If you drink, then drive, you’re a bloody idiot.’

The early years

Over the next ten years MUARC cemented its reputation as one of the world’s leading institutions in the field of safety and injury prevention research. We led a 20-year, in-depth crash investigation that led to many changes in our knowledge of crash causation and injury consequences. Locally, we helped make significant changes to speed camera programs, reducing speeding across the state of Victoria; we reduced the costs of injury at black spot locations throughout the state; our research led to changes in child-resistant packaging and nursery furniture safety standards and we made great strides in the area of domestic violence through the work of the Victorian Injury Surveillance Unit; and we introduced Australia to used car safety ratings. We worked with the auto industry and the federal government on vehicle countermeasures that led to the introduction of new vehicle standards in this country; and we engaged with the Australia and New Zealand governments in a decade of research that led to changes in older people’s licence re-assessment.

Globally, we played a leading role in the Safety Rating Advisory Committee, a project that eventually led to improvements being made by governments, as well as the international automobile industry in vehicle rating systems and consumer advice.

The new millennium

In the early 2000s, the TAC Safe Car Project was completed, demonstrating the ground breaking benefits of new technologies, including seatbelt reminder systems and Intelligent Speed Advisory Systems. We led several important studies evaluating the relative benefits of wire rope barriers, especially in rural areas. This work provided key evidence for the TAC and VicRoads’ current Safe System Road Infrastructure Program, in which wire rope barriers are being installed along Victoria’s high-risk rural roads. MUARC’s human factors research through this period also highlighted the risks of mobile phone text messaging while driving and informed more targeted safety campaigns; and in our work with Ambulance Victoria, we identified important vehicle, operational and ergonomic safety improvements for emergency services.

Partnerships and collaboration

Much of MUARC’s research impact represents sustained efforts and long-term stakeholder partnerships. A notable example of such work, the falls prevention program, drew on a decade of collaboration with national and local health agencies, leading to MUARC’s No Falls study. This study highlighted that exercises which emphasise improved balance could significantly reduce the number of falls in people aged over 70.

MUARC has continued to change the way the world approaches road safety and injury prevention generally, in transport, in the workplace, and in homes and communities. The Centre has pioneered modelling approaches to estimate the potential cost benefits of different technologies, infrastructure and enforcement countermeasures which has provided invaluable assistance to jurisdictions for their priority setting and strategic road safety planning. Other long-term projects and partnerships include the Victorian Country Fire Authority research program for identifying measures that prevent residential fires; the TAC-funded Enhanced Crash Investigation Study, which is providing new insights on crash dynamics and impact speed, and the Ozcandrive international partnership, which is providing an unprecedented understanding of older drivers’ health and driving patterns as they age.
More than just research

In 1998, MUARC gained accreditation to commence its own PhD program and, since then, has nurtured the program from its fledgling origins to a thriving, high-quality graduate program of more than 40 students. More recently, our training efforts have expanded to include executive-level, professional training, including a world-first Road Safety Management Leadership Program (which you can read about on page 38 of this Annual Report).

This is just a small selection of the many major collaborations, breakthroughs and society-wide transformations that the Centre has led over the past 30 years.

MUARC in 2017

Turning to more recent achievements, 2017 was a year of many memorable successes. Reflecting on some of the highlights:

Massive potential benefits of vehicle technology

In new research funded by Austroads, MUARC investigated the safety benefits of Cooperative ITS and Automated Driving applications such as forward collision warning, curve speed warning and right turn assist. The report concludes that the “full adoption among the light passenger vehicle fleet of a selection of key automated driving and connected vehicle safety applications has the potential to prevent between 4,100 and 6,500 fatal and serious injury crashes in Australia and 310–485 fatal and serious injury crashes in New Zealand each year”.

The tragic case of children affected by domestic homicide

During a year when partner violence and domestic abuse was again the subject of intense public discussion, researchers from MUARC’s Trauma Recovery Lab released an important research paper which aimed to better understand the circumstances, needs and perspectives of children affected by domestic homicide. Led by Dr Eva Alisic, the study was conducted in the Netherlands and funded by the Dutch Research and Documentation Centre, and the Australian National Health and Medical Research Council. Key findings were that many of these children had unaddressed histories of domestic violence and many were exposed to horrific scenes of homicide, experienced major and lasting impact, and were even more burdened than the research team expected.

Slowing things for the better in the City of Yarra

One of the hallmarks of MUARC’s achievements is its partnerships with other organisations, helping them to build a scientific base from which to make informed decisions. This year, a fine example of such collaborations involved local government partnership with the City of Yarra and considered the merits of a proposed 30 kilometre per hour speed limit in local streets. They commissioned MUARC to provide advice and to develop a pre-trial study. The report established that the trial would provide improved safety and community benefits, and concluded that it would be a worthwhile initiative.

Awards and promotions

We celebrated the successes of our staff whose excellence was rewarded in various ways through the year. MUARC Operations Coordinator, Ms Lesley Rees, was awarded the Vice-Chancellor’s Award for Exceptional Performance by Professional Staff. The award is a significant and exciting recognition of Lesley’s outstanding contribution to MUARC and Monash. Her loyalty, sound judgement and excellence in administrative leadership has contributed to the buoyant optimism that MUARC enjoys today. In the most recent academic promotions round, Dr Janneke Berecki-Gisolf, Director of the Victorian Injury Surveillance Unit, was promoted to Associate Professor. Dr Carlyn Muir was promoted to Senior Research Fellow and was also appointed to the newly established MUARC – World Health Organization (WHO) Internship role for Early Career Researchers. Dr Kristie Young, who has led MUARC’s research on driver distraction over the past decade, was also promoted to Senior Research Fellow.

Celebrating 30 years

In October we hosted an important public event to mark the 30th anniversary of MUARC. My sincere thanks to all who participated, including ABC radio presenter, Jon Faine, who facilitated a debate on the day, Monash senior leadership team – Provost, Professor Marc Parlane, and Senior Vice-Provost and Vice-Provost (Research), Professor Pauline Nester who opened the event with me, and the Expert Panel who provided their professional insights on the possibility of an injury free society.

Panellists were MUARC Deputy Director, Associate Professor Stuart Newsquest; VicRoads chief, John Merritt; En Masse Police Assistant Commissioner, Doug Fryer; The Department of Justice and Regulation’s Police and Crime Prevention deputy secretary, Kate Houghton; and Victoria Police Assistant Commissioner, Doug Fryer.

A special award (3 decades in the making)

In a special event hosted by the Vice-Chancellor of Monash University, Professor Margaret Gardner, MUARC was awarded the prestigious Vice-Chancellor’s Award for Sustained Excellence in Research Impact and Enterprise. The award was an important recognition of ‘30 Years of Effective Collaboration: The MUARC Model’. The submission highlighted the Centre’s sustained partnerships with the Victorian government through two significant programs: the Baseline Road Safety Research Program and the Victorian Injury Surveillance Unit. These programs embody the unique model that MUARC has created in which research is integrated into agency processes, policy and activities.

Congratulations to the many hundreds of MUARC staff and students, past and present, and to the many MUARC partners, who have all played a part in building a highly successful research model that has been formally recognised by the Vice-Chancellor of Monash University for sustained excellence in research impact and enterprise.

This is an impressive history on which we will build MUARC’s future for the next 30 years of research endeavour towards an injury-free community.

Professor Judith Charlton
Director
Monash University Accident Research Centre
The Behavioural Science for Transport Safety team is led by Professor Judith Charlton, and conducts research using a safe systems framework. The unit’s studies concentrate on vulnerable road users such as seniors, youth and children who use roads as drivers, passengers, pedestrians, cyclists and motorcyclists.

The Child Safety in Cars project

The unit’s focus on child passenger safety continued in 2017 with the Child Safety in Cars project. As part of the large-scale, international collaborative project, researchers used naturalistic driving methods to observe children as rear seat occupants during real-world car trips. The project was funded through the Australian Research Council Linkage Scheme and brings together researchers from Monash University, the Children’s Hospital of Philadephia Research Institute, University of Michigan Transportation Research Institute and Chalmers University of Technology in Sweden.

PhD candidate Suzanne Cross completed detailed video analysis of children’s behaviour during trips and their propensity to assume head positions that may compromise their safety in the event of a crash. This work informed the design of a series of sled tests (simulated off-set frontal crashes) which were conducted by Britax (Australia) and Autoliv (Sweden) to identify potential injury implications of children’s sub-optimal head positions. Suzanne presented her findings at several forums during the year including the Australasian Road Safety Conference in Perth, the Australian Injury Prevention Network National Conference in Ballarat, and the Protection of Children in Cars Conference in Munich.

PhD candidate Jonny Kuo made important contributions to the driver distraction component of the project and was awarded the degree of PhD in 2017.

Ozcandrive III

In 2017 Ozcandrive – now known as Ozcandrive III – marked its 7th anniversary with a special event and presentation to study participants. The longitudinal study, now entering its 8th year, is following the health and driving patterns of older drivers and can proudly claim to be the oldest and longest running cohort study of drivers. Around 180 of the original 257 participants, all of whom are now octogenarians, remained active in the project in 2017.

In August, the team welcomed a new PhD student, Renée St. Louis from the US where she worked as a Research Associate in the area of older drivers at the University of Michigan Transportation Research Institute. Renée has an interest in understanding positive ageing and the factors that contribute to older adults’ capacity to maintain safe mobility, while they are drivers and beyond.

One of the main objectives of the study is to develop a tool that clinicians can use to identify older drivers who may be unsafe and need further assessment of their driving ability. This component of the project is drawing to a close, with promising outcomes expected for release soon.

At two conferences – the Naturalistic Driving Research Symposium in The Hague and the International Association of Gerontology and Geriatrics World Congress in San Francisco – members of the team presented findings from five years’ worth of Ozcandrive data.
Older drivers linkage study concludes

Dr Sjaan Koppel, with Associate Professor Michael Fitzharris, Associate Professor Stuart Newstead, Angelo D’Elia and Professor Judith Charlton, completed an extensive program of research on older road user crashes and associated risk factors. This research, commissioned by the MUARC Baseline Research Program, used Victorian data sources (i.e. TAC/MUARC linked dataset, Victorian Admitted Episodes Dataset and Victorian Emergency Minimum Dataset data, VicRoads Registration data, VicRoads Licencing and Offence data and Coroners Court of Victoria data) to examine trends in the occurrence, severity and associated costs of older road user crashes and associated risk factors.

These analyses identified several current and emerging older road user crash trends, including:

- Current data systems and linking opportunities
- Vehicle choice
- Infrastructure and intersection design
- Speed limit setting
- Licensing policy (including medical review)
- Implications of, and need for, safe active transport
- Educational resources tailored for older road users

The findings from this research program will be used by Victorian road safety partners to guide policy and inform the development of future action plans to reduce older road user crash-related deaths and serious injuries.

ANDS the next phase is…

The Behavioural Science for Transport Safety and Human Factors teams continued their important participation in Australia’s first large-scale study of everyday driving behaviour, known as the Australian Naturalistic Driving Study (ANDS). The project is a national collaboration led by the University of New South Wales and involving Monash University, Queensland University of Technology, the University of Adelaide, Curtin-Monash Accident Research Centre and Virginia Tech Transportation Institute (USA). It uses advanced sensors and data-logging technologies to examine driver behaviour including interactions with road infrastructure and other road users.

The data collection phase of the project was completed in December 2017. In total, 352 volunteer drivers aged between 20 and 70 (in Victoria and New South Wales) participated in the research and had their cars fitted with a Data Acquisition System (DAS) to record their driving over a four-month period. The DAS is a device comprising sensors and dataloggers (including video, acceleration in multiple axes, gyroscopic motion, indicator status, speed, radar and GPS position) that allows researchers to continuously record vehicles and collect driver-based data.

Professor Judith Charlton heads the MUARC-based ANDS team with Dr Kristie Young, Dr Sjaan Koppel, Technical Officers, Yin-Xiang Hue and Andrew Lyberopoulos and Research Assistant, Rachel Osborne.

The project receives funding from the Australian Research Council through the Linkage Scheme. Government and industry partners include the Centre for Road Safety at Transport for NSW, NRMA, the Transport Accident Commission, VicRoads, the Motor Accident Commission in South Australia, the Western Australian Office of Road Safety, Seeing Machines and Hyundai Australia.

The project has now entered the data analysis phase. ANDS data will allow researchers to study how drivers deal with hazards, including busy intersections that have no traffic lights and difficult driving situations (such as pedestrians unexpectedly crossing the road or other drivers engaging in risky behaviour).

As part of her Australian Research Council Discovery Early Career Researcher Award project, Dr Kristie Young is using the ANDS data to explore the role that positive driver self-regulation can play in mitigating the impact of distracted driving on performance and safety.

Congratulations to the entire team who have contributed to the smooth operation of the data collection phase of the project, including the very large group of highly competent technical and research assistants who have supported the Project Investigators.

Pioneering cycling work continues

The safety of cyclists remains a priority research area within MUARC, given that the popularity of cycling continues to increase in Australia. A greater understanding of the urban transport system and the improvements needed to create a safer cycling environment are essential if cyclists are to be safe and increased cycling participation targets are to be achieved.

The “Safer cycling in the urban road environment” study, now in its third year, is funded through the ARC Linkage Grant Scheme, and conducted in Melbourne and Perth. The project is conducted in partnership with Curtin University, Portland University in the USA, the TAC, VicRoads, Main Roads WA, the Amy Gillett Foundation and Cycling Promotion Foundation. The research draws together existing cyclist injury data and unique cyclist exposure data (using naturalistic study methods) to develop road infrastructure prototypes that improve cyclists’ safety. Another component of the study uses an innovative approach to evaluate the effectiveness of these prototypes using MUARC’s simulator facilities (the BikeSim and driving simulator).

The outcomes of the study will inform future cycling investment programs. The findings will also be used to identify where improvements should be made to current design practices or route selection for cycling projects and where further innovation is necessary.

Some highlights from the study include:

- Intersection typology was found to be associated with risk of injury. Specifically, the use of roundabouts to control traffic increased the likelihood of severe injury over using traffic signals and other priority control devices.
- Exposure to unprotected tram tracks, parking, and longitudinal gradient was associated with injury.
- Exposure to speed limits in excess of 50 kilometres per hour without bicycle infrastructure increased the likelihood of injury (compared with lower speed limits with or without bicycle infrastructure).
- Several innovative bicycle lane design concepts were shown to have potential to encourage safer cycling by increasing the spatial separation between cyclists and motor vehicles.
- Cyclist perceptions of these designs were positive compared with designs that are commonly used in Australian bicycle lanes.
In other achievements:

The team presented ‘Cyclist exposure to the risk of car door collisions in mixed function activity centres: A study’ at the 61st Association for the Advancement of Automotive Medicine Annual Conference in Melbourne. The study was also published in Traffic Injury Prevention.

At the Australasian Road Safety Conference 2017, the team made presentations from the Australian Naturalistic Driving and Cycling study:

- ‘Naturalistic observation of route choices in cycling studies’ (Associate Professor Jennie Oxley et al).
- ‘Computer vision for bicycle lane width and lateral position estimation’ (Associate Professor Jennie Oxley et al).
- ‘See no evil, report no evil: The benefit of rearward facing footage to identify risks to cyclists’ (Brendan Lawrence, et al).

Team members also made presentations at international conferences:

- ‘Validation of a bicycle simulator for road safety research’ (Steve O’Hern et al.) at the Road Safety and Simulation Conference in The Hague, Netherlands.
- ‘Fixies and frothies: An examination of intoxicated cycling in Australia’ (Steve O’Hern et al.) at the International Cycling Safety Conference, California, USA.

The future of the study

The last phase of the study to be conducted in 2018 is a ‘translational workshop’. The workshop will bring together local, national and international experts to share findings and discuss pathways and barriers to effective infrastructure implementation. The aim will be to:

a) improve safety for cyclists on urban roads through infrastructure design

b) enhance the dissemination of findings from the research and provide the evidence-base to inform the selection and development of road design and infrastructure measures to address priority cyclist collisions and future cycling investment programs.

Supporting safe mobility among older road users in New South Wales

There are significant changes emerging regarding transport and mobility expectations among older road users, including high personal mobility, greater use of the private car, as well as increased use of other travel modes.

In a project commissioned by Transport for New South Wales, the team undertook an extensive review of the effectiveness of tools, resources and programs to:

- support older drivers’ self-regulation and transition to retirement from driving; and
- assist health professionals and licensing authorities to assess fitness to drive.

The review examined the quality of evidence for the effectiveness of resources and programs and provided recommendations for the applicability to the New South Wales transport and licensing context.

A total of 53 resources and programs were identified for drivers addressing self-regulation and safer driving, transition from driving and 34 tools to assist clinicians in assessing fitness to drive. One hundred and ninety-two papers were reviewed providing evidence on the effectiveness of these resources. In addition, the review highlighted more than 233 mode shift schemes designed to encourage older people to use transport modes other than driving a private motor vehicle were identified.

Based on their extensive review, the research team presented a number of good-practice principles and promising tools and programs to address the safe transportation and mobility needs of older people. The report also highlighted the crucial role of clinicians and the importance of partnerships between health professionals, driver licencing authorities, local government and peak bodies for ageing.

The team included Associate Professor Jennie Oxley, Professor Judith Charlton, Dr Sjaan Koppel and Research Assistants, Phuong Hua, Mohammed Aburumman and Tricia Williams.
European driver training and fitness to drive project

In partnership with a consortium of European research teams including Transport Research Laboratories and Loughborough University (UK), SWOV (Netherlands) and BaST (Germany), Professor Brian Fildes and Associate Professor Jennie Oxley, with the assistance of Tricia Williams, delivered a study on driver training, testing and medical fitness to drive for the European Commission.

They undertook a comprehensive review of different approaches to training, testing, graduated access to risk for drivers and motorcyclists, driving instructor competencies, and requirements on medical fitness to drive (including its relevance for older drivers). The primary focus of the review was to evaluate and summarise the available evidence on the effectiveness of different approaches in terms of road safety outcomes.

Current practice across Europe was also outlined, based on the existing literature (covering the majority of Member States) where possible, and also based on responses to a short online survey (with wide participation from 25 countries in Europe).

Using the evidence reviewed, a series of good-practice approaches was defined, and then discussed at a stakeholder workshop in Brussels. The focus of the discussion at the workshop was on identifying barriers to and enablers of implementation of the different good-practice approaches in European countries.

Twenty-seven recommendations were made to support progress towards good practice in all these areas across Europe.

Making mixed use arterials safer

In partnership with the Australian Road Research Board, Corben Consulting, the Centre for Automotive Safety Research and MHW Global, Associate Professor Jennie Oxley and Dr Karen Stephan contributed to a study investigating the safety of mixed use arterials in Australasia.

This study provides a synthesis of key safety solutions as well as issues that need to be considered when effectively addressing safety on urban mixed use arterial routes. Such roads account for a large proportion of high-severity crashes in Australia and New Zealand, particularly involving vulnerable road users.

Austroads commissioned research to help identify solutions that might be applied on these arterial roads to improve safety through the provision of Safe System infrastructure.

The project involved assessment of six case studies around Australia and New Zealand. Preliminary concept designs were developed for each of the routes based on the findings from several workshops and subsequent discussions. The likely safety benefits were assessed with estimates of likely crash reductions as well as alignment with the Safe System objective of eliminating death and serious injury.

The findings of this study will have implications for road design and operation and will facilitate a greater understanding of the Safe System approach amongst designers, local authority staff, key stakeholders and the public.
HUMAN FACTORS IN TRANSPORT AND WORKPLACE SAFETY

The Human Factors team is made up of members with a diverse array of knowledge and from various disciplines, among them psychology, design, computer science and engineering. As a unit, we are interested in how people interact with complex work systems; our overarching aim is to prevent accidents, mainly through the use of human-centred methods. We focus on safe design and user-centred evaluation of systems, equipment, tasks and environments.

In 2017, the unit continued to concentrate on areas such as road transport, mining, medical and the workplace.

Welcome to Dr David Logan

Dr David Logan joined the Human Factors and Workplace Safety team in early 2017, having worked at MUARC for many years in areas such as road safety modelling, engineering and vehicle automation. Amongst the many projects he undertook in 2017, he led a major project for Austroads that examined the safety benefits of automated vehicles and Cooperative Intelligent Transport Systems. The project involved input from other members of the Human Factors team, including Dr Kristie Young and Professor Tim Horberry, as well as MUARC colleagues from outside the unit.

Army teamwork project concludes

A major project involving Professor Horberry in Melbourne (and Ben Hoggan in Adelaide), in partnership with the Commonwealth Department of Defence, came to a successful end in early 2017. The project spanned multiple years, covering both lab-based work and field-based naturalistic research. The Human Factors team helped design different exercises involving teams of soldiers and studied improvement in communications and leadership within the army teams.

A (mining) project complete; a book on the way

For the last several years Professor Horberry has been working with colleagues from the University of Queensland and the National Institute for Occupational Safety and Health in the United States on several projects in the mining sector. These produced a roadmap for human-centred design of mining equipment, including development of design material, case studies and educational information for use by the minerals industry. The most recent project came to a conclusion in 2017. The team will use the outcomes from it for a book: Human-Centered Design for Mining Equipment which is currently being completed by Horberry, Burgess-Limerick and Steiner. The book will be published by CRC Press USA/Taylor and Francis UK, and will be available in early 2018.

A long road to a short course

Led by Dr Sharon Newnam, the team’s work in the field of workplace road safety continued in 2017. In addition to progress being made on existing projects, we developed a short course in workplace road safety this year, and plan to offer the program for the first time in 2018.

Injury outcomes work progressing well

Dr Dianne Sheppard continues to lead the unit’s work in the area of injury outcomes. One of her major projects in 2017 was the ongoing development and testing of a fast track recovery app, funded by the New South Wales State Insurance Regulatory Authority. Dr Sheppard was also a Chief Investigator for a successful grant from the National Breast Cancer Foundation called “Testing the feasibility of a support intervention for transitioning back to ‘good’ work following breast cancer”. This project will start in 2018.
Simulators take centre stage

The Human Factors team is responsible for MUARC’s driving and riding simulators, and they once again took a leading role in the work of the unit during the year. The car, portable car, cycle, motorcycle and defence simulators were used steadily throughout 2017. They also attracted interest from the many local and international visitors who toured Monash facilities between January and December.

In close collaboration with Associate Professor Michael Fitzharris, the team began in earnest a major simulator project looking at developing the next generation of fatigue and distraction technology. This work is being conducted using Cooperative Research Centre Projects funding and is bringing together MUARC, Seeing Machines and Ron Finemore Transport.

Throughout 2017 the major activity undertaken as part of this project was testing alert and sleep-deprived drivers in our car simulator. We aim to test up to 80, and testing will continue into 2018. The lead researcher is Christine Mulvihill, directed by Professor Horberry and Associate Professor Fitzharris.

The newest addition to our simulator suite will be a state-of-the-art truck simulator, which we worked on throughout 2017, and which will be ready for use in 2018.

Distraction research worth paying attention to

Following a period of maternity leave, Dr Kristie Young commenced her Discovery Early Career Researcher Award fellowship in March 2017. The work she commenced, and will continue in 2018, as part of the fellowship, is investigating driver distraction and self-regulation of attention.

In the same broad field, Dr Young and Professor Horberry undertook projects in 2017 with both Metro Trains and VicRoads looking at driver/operator distraction issues and how they can be managed.

Professor Horberry, Dr Young and Rachel Osborne commenced a MUARC Baseline project looking at pedestrian distraction caused by smartphone use, with a particular focus on risky behaviours from using smartphones while crossing busy roads. This work will continue in 2018.

Global opportunities

The Human Factors and Workplace Safety team continued to enjoy many national and international collaborative relationships and opportunities in 2017. These include:

- A visiting Fellowship at Cambridge University in England for Professor Horberry.
- Joint projects with colleagues in Europe and North America (such as Dr Newnam’s heavy vehicles work with University of Michigan Transportation Research Institute in the USA).
- Major international conferences, among them Dr Logan at the Association for the Advancement of Automotive Medicine Conference in the USA in late 2017.

We were also active with other colleagues across Monash University. For example, we were part of two Monash Infrastructure grants which finished at the end of 2017, one investigating automated vehicles and the other concentrating on tram safety.

Congratulations to our PhD students

It was another excellent year for our PhD students who once again undertook cutting-edge research in critical areas such as:

- Medical safety (Raphaela Schnittker)
- Mining industry leadership (Sarah-Louise Donovan)
- Workplace risk/OHS (Ivan Cikara, Mohammed Aburumman)
- Traffic incident management (Vanessa Cattermole, supervised by Professor Horberry at the University of Queensland)
- Vehicle automation (Nebojsa Tomasevic)

They are regularly publishing their work in leading scientific journals such as Applied Ergonomics.
INJURY ANALYSIS AND DATA

Led by Associate Professor Stuart Newstead, the Injury Analysis and Data (IAD) team’s expertise lies in highly analytical data-driven safety research. The unit’s researchers are specialists in numerical and behavioural sciences and public health, possessing the ability to manage, analyse and present accident and injury data to produce real-world benefits. Collecting, analysing and interpreting data with accuracy, rigour and insight is essential to the safety sciences, and this expertise brings about collaborations with leading public and private organisations across Australia and the world.

Quantifying and improving the safety of vehicles

During 2017, the team’s program of research into vehicle safety performance achieved a significant milestone. August marked the 25th annual publication of the Used Car Safety Ratings (UCSRs), which is produced by the IAD team. This comprehensive guide gives consumers information on the safety of their current vehicle and any used vehicles they are considering buying based on real-world crash outcomes.

This year, the ratings were able to cover more vehicle makes and models than ever before due to enhancements to the data system underpinning the ratings.

A significant change to this year’s ratings was the inclusion of a crash risk rating to augment the existing ratings that focus on injury mitigation in the event of a crash. A raft of crash avoidance technologies such as electronic stability control and autonomous emergency braking have been introduced into new vehicles in recent years, the impacts of which will now be reflected in the UCSR program.

Capitalising on the power of the database assembled to produce the UCSRs, the team completed a number of additional research projects.

Stemming from a review by the Australian Government of new and used vehicle importation rules, researchers from the IAD unit completed a study examining the potential safety impacts of allowing additional used imported vehicles into Australia. New Zealand, where used vehicles are imported in large numbers, was used as the benchmark comparison to estimate the likely safety impacts of similar policy in Australia. The team explored the impact of visibility from vehicles on the risk of pedestrian collisions; they also measured the benefits of reversing technologies, such as cameras and sensors, in reducing pedestrian back-over crashes.

The team undertook two major projects in collaboration with economics consultancy Economic Connections and engineering consultancy Pekol Traffic and Transport. Conducted for the Australian Automobile Association, the first examined the potential safety and emissions benefits from government policy to reduce the average age of the Australian light vehicle fleet, which has been steadily increasing over time. The second estimated the safety benefits realised by the Australian New Car Assessment Program in accelerating the fitment of proven safety technologies in new vehicles in Australia.

Improving the safety of high-risk and vulnerable road users

If we consider the road trauma problem in statistical terms, vulnerable and high-risk road users are disproportionately represented. With this in mind, a number of research projects undertaken by the IAD team in 2017 focused on key, high-risk road user groups.

Evaluation of the P Drivers Project, one of the largest trials of a behaviour change-based program for new probationary drivers ever undertaken, neared completion in 2017. Evaluation of the New South Wales Safe Driver Course, a similar program aimed at learner drivers, also neared completion. Results from both these projects should be available in 2018 and will provide significant evidence on the benefits of behaviour change programs to improving novice driver safety.

As part of the MUARC Baseline Research Program funded by the Victorian Government Road Safety Partnership, a major research program examining older road user safety and predicting the future trauma burden from crash involvement of older road users in Victoria’s ageing population was completed.
The IAD team contributed to the design and assembly of a research database to facilitate the project and the analysis of crash patterns and licensing trends in older road users. Outcomes from the project have led to strategic priorities for improving older road user safety being identified.

Two new projects commenced under the Baseline Research Program to which the IAD team will make a major contribution. The first is examining the role of prescription medicines in contributing to road crash risk. It will undertake a comprehensive literature review to establish current knowledge regarding prescription medicines and road safety as well as investigating the feasibility of establishing a suitable linked data system to further measure risk in the Victorian context. A second project seeks to establish a comprehensive data system to inform heavy vehicle safety research in Victoria – this has been identified as a priority area due to the projected future high growth in heavy vehicle exposure.

Finally, the team completed a literature review for the TAC examining the relationship between distracting activities and crash risk to inform the development and targeting of future countermeasures to mitigate these behaviours.

Assisting in setting strategic directions

Road safety strategies developed by government agencies in Australia provide the framework for selecting and implementing countermeasures to achieve specified goals for road trauma reduction. During 2017, both the Victorian and New South Wales governments commenced the process of reviewing the performance of current road safety strategies to identify whether set trauma reduction targets were likely to be achieved and, if not, which additional or expanded countermeasures could be implemented to do so. As part of these reviews, the IAD team developed a modelling approach to estimate the road safety impacts of past and likely future contributions of road safety programs implemented under the current strategy.
Research also produced forecasts of future road trauma levels predicted based on anticipated program investment under the current road safety strategies. These forecasts were then used as the basis for further strategic modelling of packages of additional countermeasures required to meet trauma reduction targets set under each strategy.

A key enabler of the IAD team strategy research was the Traffic Enforcement Resource Allocation Model (TERAM) previously developed under the Baseline Research Program. For the first time, TERAM allowed estimation of the potential road trauma impacts of additional investment in enforcement programs by Victoria Police and the Department of Justice to be integrated into the broader strategic road safety modelling exercise along with more traditional investments in infrastructure and vehicle safety improvements.

As part of the Curtin-Monash Accident Research Centre collaboration, a comprehensive literature review of priorities and countermeasures to improve rural and remote road safety was undertaken. The review will provide policy direction for the Western Australian government to target safety programs into an area that represents a significant problem for that state.

Improving the effectiveness and efficiency of road traffic policing

The team demonstrated its expertise in the area of police traffic enforcement through a wide range of projects undertaken in 2017. The unit commenced projects for the ACT Government to evaluate both the Alcohol Interlock Program for convicted drink-drivers and the fixed and mobile speed camera program. Results from these studies are expected in 2018.

Methodology was also developed for the optimum selection of new fixed speed camera sites to maximise road safety benefits in both Victoria and Western Australia. The team completed further evaluation of the Queensland Camera Detected Offence Program (CDOP) as well as a project providing strategic advice on the potential future expansion of the CDOP to maximise the road safety and economic benefits of the program.

Under our World Health Organization Collaborating Centre on Violence and Injury Prevention for the Western Pacific Region (WHO WPRO) arrangements, the IAD team, in partnership with Victoria Police and WHO WPRO, developed and delivered a workshop titled ‘Safe System and Police Enforcement in select Pacific Island Nations’. The program focused on legislation, policing and enforcement equipment for road safety.

Key objectives for the course included:

1. To support the opportunity for increasing technical knowledge in national counterparts on effective road policing.
2. To facilitate the development of technical networks of traffic police in low- and middle-income countries.
3. To support scaling up of enhanced enforcement operations in low- and middle-income countries.

The course was delivered using a range of learning formats, including classroom activities and practical demonstrations during police operations. Feedback on the course was very positive. Participants were senior police and justice officials from Pacific Island countries.

Guiding emergency services

Strong collaboration between MUARC (led by the IAD team) and the Victorian Country Fire Authority continued in 2017. A number of key projects were completed as part of the collaboration during 2017, including:

- An analysis of factors influencing crash involvement of CFA vehicles leading to recommendations on strategies to reduce crash risk and the CFA fleet, including fire-fighting appliances as well as corporate fleet vehicles.
- Further analysis of factors influencing the risk and severity of residential fires in CFA serviced areas. Outcomes of this project have been integrated into a CFA-developed mapping tool to identify high prevalence zones for identified risk factors. The mapping tool is being used to more precisely and effectively target prevention initiatives.
- A feasibility study was conducted into the potential linkage of the CFA Fire Incident Reporting System with various other administrative data sources to improve the identification and severity classification of people injured in CFA attended events. The feasibility study led to a pilot linkage of feasible data sources to be conducted during 2018.

In 2017, another focus was occupational injury in the emergency services. In collaboration with colleagues from the Monash Faculty of Medicine, the IAD team conducted two projects aiming to better understand both physical and psychological injury in police. The police injury study involved analysis of injury claims over time, and the mental health prevalence study involved an organisation-wide survey of both operational police and public service employees.
INJURY OUTCOMES RESEARCH

With an overarching aim of helping injured people to receive better healthcare, the Injury Outcomes Research Group conducts research into how they react to, respond to and cope with injury and trauma. The group comprises researchers who possess expertise in medicine, epidemiology, statistics, psychology, health promotion and population health. Researchers from across MUARC work in close collaboration with the Institute for Safety, Compensation and Recovery Research (ISCRR), WorkSafe Victoria, the Transport Accident Commission (TAC), as well as injury-focused stakeholders across the world.

Crash and injury outcomes for older road users
A major, MUARC-wide collaborative project exploring crash and injury outcomes for older road users included the analysis of the TAC-Linked Claims Dataset. This provided new insights into the financial cost of older road user trauma, which is directly related to the type of road user and also the speed zone in which the crash occurred.

This multi-faceted project, funded under the MUARC baseline program, will be completed in 2018.

Spinal cord injury prevention research
Associate Professor Michael Fitzharris continued active participation in the International Spinal Cord Society (ISCoS) as the Chair, Road Crash Prevention Sub-Committee, and Member of the Prevention Committee.

Dr Sara Liu attended the 56th International Spinal Cord Society Annual Scientific Meeting, ISCoS, which was held in Dublin, where work was presented on ‘The incidence and cost of SCI resulting from road crashes in Victoria, Australia’. She also participated in the Psychologists’ Interest Group.

Rehabilitation support
Dr Sara Liu and Associate Professor Michael Fitzharris were engaged by AP Psychology and Consulting Services to evaluate their Motivational Interactions training program. The program supports organisations to develop strategies linked to outcomes. It does this by training and coaching people in the rehabilitation sector to develop skills in better managing people presenting with complex and challenging wellbeing issues.

In 2017 a pilot analysis was completed and support was found for the program. The team has continued to work with AP Psychology with the aim of implementing a large-scale evaluation of their program, which is novel in this field of occupational rehabilitation and compensation providers.

Trauma and trauma recovery
The Trauma Recovery Lab, within MUARC, aims to understand and facilitate children’s and families’ recovery from traumatic stress. The Lab presented on child trauma outcomes in 11 international conference presentations in 2017, including at the conferences of the European Society for Traumatic Stress Studies (Denmark) and the International Society for Traumatic Stress Studies (USA).

MUARC researchers also had numerous papers published on the subject of trauma during this year in areas such as:

- Parent-child conversations after potentially traumatic events
- Children bereaved by fatal intimate partner violence
- Psychological distress in pre-hospital providers
- Trauma-informed care for children in the ambulance
- The epidemiology of trauma

They were published in journals such as The Journal of Evidence-Based Mental Health, PLOS ONE, European Child and Adolescent Psychiatry, Emergency Medicine Journal and Journal of Paediatrics and Child Health.
The short- and long-term outcomes of work-related injury

The WorkSafe Victoria hospital data linkage study is a multi-phase piece of work funded by WorkSafe Victoria through the Institute for Safety, Compensation and Recovery Research (ISCRR). The study is designed to determine the impact of pre-injury health on short-term (up to two years) and long-term (up to seven years) outcomes of work-related injury.

Pre-injury health is captured in terms of chronic disease indicators, developed for this project from ICD-10-AM coded admissions data. Injury outcomes include claim duration, time off work, health service use, but also long-term morbidity and mortality. The team of investigators on this project are Dr Janneke Berecki-Gisolf and Voula Stathakis (MUARC).

Voula Stathakis presented some of the results from the first phase of the study at the Australian Injury Prevention Network conference in Ballarat in November. Her presentation was titled ‘Chronic disease prevalence in a cohort of injured workers in Victoria, Australia: using hospital data linkage to determine pre-injury health’.

The second phase of the study involves linkage of workers’ compensation claims to hospital admissions and death data for a period of up to seven years after the injury. The linked data was successfully applied for and received in 2017. The next report, due in 2018, will focus on the effects of work-related injury on chronic disease incidence and health service use, as well as the impact on mortality.

Health service needs of TAC clients before and after transport accidents

This project involves linking TAC claims data with Victorian Hospital Admitted Episodes Data (VAED), Mental health services data (CMI/ODS), and Alcohol and Drug Information System (ADIS) data. The study is funded by the TAC through ISCRR.

Data linkage is carried out by the Victorian Data Linkage Unit at the Department of Health and Human Services.

The purpose of the project is to provide a better understanding of:

1. How TAC clients’ pre-existing physical and mental health and health service use affect their injury and claim outcomes.
2. The impact of compensable road traffic injury on TAC clients’ long-term physical and mental health and health service use.

This will provide a knowledge base that can be used to improve the support provided to TAC clients. The scope of the research includes not only hospital admission data to determine comorbidity, but also mental health and alcohol and drug treatment data, which have not been studied by the TAC before.

The investigators on this project are Dr Janneke Berecki-Gisolf, Dr Trevor Allen and Dr Sara Liu.

In 2017, linked TAC-VAED data was successfully applied for and obtained, and the first report, detailing TAC injury outcomes, was completed and delivered to the TAC. Analysis for the next report, exploring the linked data, is underway. The mental health and alcohol and drug service data linkage has been approved and the linked datasets are expected in 2018.
Injury Outcomes Research

In September 2016, Tharanga (Tara) Fernando commenced her PhD work on the data linkage project titled ‘The Injury Comorbidity Index Study’. The study, which is a collaboration between MUARC and the Department of Health and Human Services, involves data linkage of hospital treated injury and death data. The PhD supervisors are Dr Janneke Berecki-Gisolf, Dr Stuart Newstead and Dr Zahid Ansari.

The incidence and prevalence of injury and chronic health conditions are on the rise in Australia. This study builds on the concepts used in the Charlson Comorbidity Index (CCI) to quantify the effect of comorbidity on outcomes. The CCI is now dated (due to advancement in medical sciences) and presents various limitations, including limited applicability.

The purpose of this PhD study is to develop and validate new indices to assess the impact of comorbidity on injury outcomes and compare the performance of the new indices with the CCI, using Australian administrative datasets and data linkage. The outcomes of interest are mortality, readmission to hospital, length of stay in hospital, hospital costs, complications, use of critical care services and the need for long-term nursing care. The new comorbidity indices will be used to develop scales which predict the likelihood of these injury outcomes and will be beneficial to epidemiological research, clinical care including risk stratification of patients at hospital admission and planning of health and social services.

The study is progressing well; the Victorian and New South Wales linked dataset was received in 2017. Data linkage application to Western Australia was successful and ethics approval obtained. Drafting of the first two papers for this thesis are currently underway.

Occupational rehabilitation

The occupational rehabilitation collaborative endeavour between Dr Dianne Sheppard from MUARC, Association Professor Georgia Halkett from Curtin University, and Dorothy Frost from IPAR Rehabilitation made significant progress in 2017. After being awarded a Cancer Council Victoria research vacation studentship, the team secured a grant for a two-year project from the National Breast Cancer Foundation (NBCF). This grant, will allow them to work on a project called ‘Testing the feasibility of a support intervention for transitioning back to ‘good’ work following breast cancer’. The return to work support intervention aims to identify and modify the impact of biopsychosocial and workplace factors that could hinder transitioning to good, sustainable work for breast cancer survivors. A pilot implementation of the feasibility study is already underway with the first participants coming through the program in early 2018. The NBCF-funded project will enable Dr Sheddard’s team to develop and evaluate a novel, innovative, multimodal program to support those who have been diagnosed with breast cancer to optimise their wellness and quality of life though participation in work that is tailored to their specific needs.

Injury recovery app

In 2016, Dr Sheppard, began collaborative work on promoting active and self-managed recovery for people with mild to moderate injuries following a motor vehicle accident.

The injury recovery app is now in prototype (beta) stage, with trial implementation planned for March or April, 2018. The app will be trialled with the target population for a period of eight months upon which follow-up evaluation data will be collected. Results are expected to be available in early 2019.

Vacation studentship

Dr Sheppard, along with an outstanding third year Psychology student, Alice Macdonald, were awarded a cancer research vacation studentship for the summer period 2017–2018. As a result of the funded studentship, Alice spent six weeks preparing and writing a systematic review on the efficacy of work-related interventions for cancer survivors.
The impact of climate change demands that everyone becomes more resilient to its outcomes. The Monash University Disaster Resilience Initiative (MUDRI) responds to this challenge with its multidisciplinary team that combines industry and academic experience in emergency public health, anthropology, emergency management, social science and disaster risk reduction. The group comprises Emeritus Professor Frank Archer, Dr Caroline Spencer, Dudley McArdle, Dr Saadia Majeed, Dr Debra Parkinson and Samantha Bailey. Launched in 2012, MUDRI dates back to 2005 where it had its origins in the Faculty of Medicine, Nursing and Health Sciences.

Research outputs
During 2017, the MUDRI team worked on a number of research grants and publications:


Women’s Health Goulburn North East and Women’s Health in the North
Literature review on Long-term Disaster Resilience: What hinders or enables disaster resilience beyond the first three years of a disaster. This project will inform the National Conference on Diversity in Disaster in April 2018. The National Disaster Resilience Grant Scheme funded these projects.

Community evaluations
Two evaluations:
- An evaluation of workshops based on responsible burning-off practices for EMTRAIN.
- An evaluation of the ECH Centre of Resilience for the Emerald Community House.

Research publications
Five publications, and two reports to funders. Of note was The Australian Institute of Disaster Resilience’s Monograph called Generic Emergency Disaster Management Standards: A Framework for Higher Education Programs in Emergency and Disaster Management for Australia, a project led by Professor Gerry FitzGerald from the Queensland University of Technology.

Graduate education
In 2017, the MUDRI higher degree by research program comprised 11 students in the Masters by Research and seven in the PhD program. All MUDRI students remain on track with candidature milestone achievements. Students from both cohorts attended the annual MUDRI one-day Colloquium and engaged with national leaders in the field. MUDRI celebrated its first Masters submission: Dudley McArdle’s thesis on professionalism in emergency management.

MUDRI also welcomed 23 coursework students from the Master of International Development Practice and Master of Nursing during the year. We particularly appreciated the continued academic and professional support from the Faculty of Arts. Faculty staff provided valuable assistance to MUDRI and facilitated the restructuring of the two current MUDRI units into a revised double unit ‘Guiding principles for professionals engaged in disasters and humanitarian crises’, which will be implemented in 2018.
Major lectures
Professor Gerry FitzGerald, Professor of Public Health and Director of the Centre for Disaster and Emergency Management at Queensland University of Technology, presented the 12th Annual Professor ‘Skip’ Burkle Jnr Keynote Lecture, titled ‘Emergency and Disaster Management in Australia: A framework and standards for higher education providers’. This was a highlight of MUDRI’s year.

The third Claire Zara Memorial Lecture was held at the 2017 Emergency Services Foundation National Conference. Mary Barry, the CEO of Our Watch, an organisation that aims to prevent all forms of violence against women and their children, presented the keynote presentation titled ‘Why Gender Equality is Important in Emergency Services’.

Global reach
The international exposure of MUDRI continued to grow. MUDRI staff made two presentations at the World Congress titled ‘Emergency and Disaster Management in Australia: A framework and standards for higher education providers’. MUDRI continued its exciting new collaboration with the University of Greenwich, London. The unit will undertake research on using computer support to increase community-based resilience and preparedness in the event of an unexpected emergency.

Professional outreach
The professional outreach of MUDRI included:
- Review of the National Community Recovery Manual managed by the Australian Institute of Disaster Resilience.
- Membership of the Gender and Disaster Pod, in partnership with Women’s Health Goulburn North East and Women’s Health in the North.
- Membership of the National Emergency Management Education Alliance, hosted by the Australian Government Attorney General’s Department.

Launched in 2015, the MUDRI/Emergency Management Victoria Compendium on Community-Based Resilience Case Studies, a first in Australia, continued to grow strongly in 2017. MUDRI collated case studies to help communities develop their resilience, particularly in the setting of disasters and emergencies. Resilient Melbourne includes this project in its Strategy as a means to scale-up resilience.

Awards and achievements
The prestigious Mary Fran Myers International Award was presented to Dr Debra Parkinson on behalf of a broad gender and disaster collaboration, which included the researchers (Deb and the late Claire Zara, a former PhD Candidate at MUDRI), the Gender and Disaster Pod (Susie Reid of Women’s Health Goulburn North East; Helen Riseborough of Women’s Health In the North; and Emeritus Professor Frank Archer of MUDRI), Emergency Management Victoria, the Department of Health and Human Services, the Gender and Disaster Taskforce and the community.

The International Gender in Disaster Network presented this annual award. The award acknowledges the leadership of the team associated with the Victorian Wild Fires of 2009 and subsequent risk resilience initiatives, but also the collaborative work across researchers and practitioners based at women’s health NGOs, Monash University, emergency management and health protection organisations in Victoria. The award recognises the important Victorian-based research in the field of gender and disaster, the innovative collaboration and the sustained way the team addressed issues of local, national and international significance.

Saadia Majeed accepted a Fellowship into the international Integrated Research on Disaster Risk (IRDR) Young Scientists Programme. IRDR is a decade-long research program cosponsored by the International Council for Science, the International Social Science Council and the United Nations Office for Disaster Risk Reduction. The Academy of Sciences hosts this program in China.

Dr Caroline Spencer graduated from the year-long Rivers and Ranges Community Leadership Program (RRCLP). Modeled on other successful Victorian leadership programs, this program takes participants through a ten-month transformational learning experience. The program gives participants exposure and connections to community, state and federal leaders, taking leaders on a journey of personal discovery and using the principles of community capacity and resilience building. RRCLP’s vision ‘develops leadership to build resilient, connected and thriving communities’.

MUDRI @ MUARC
MUDRI again contributed to MUARC in 2017 and we would like to thank the staff who championed the group’s successes. MUDRI’s strength lies in its people and network; it is stronger for having their support as it continues its mission to build the resilience of many communities in the face of unexpected emergency events.
PHD AND MPHIL CANDIDATES

The graduate research program continued to provide a vibrant research environment for MUARC’s PhD, Masters and Honours/vacation students in 2017. Our graduate students undertake transformative and interdisciplinary research that is at the forefront of finding sustainable, social, economic, environmental and technical solutions to eliminating injury. Their research topics align with MUARC’s priority to provide the scientific evidence that underpins the prevention and management of injury across the full range of injury types and mechanisms within transport, workplace, home and community settings.

Our graduate student cohort remained strong throughout 2017. At the commencement of 2017, we had a total of 42 students (29 PhD and 13 MPhil). In addition, our supervisors co-supervised an additional 13 non-MUARC students (enrolled in various faculties, Monash Malaysia and Queensland University of Technology). The year finished with 39 students (27 PhD and 12 MPhil).

Student highlights

- We welcomed one new student in 2017: Renee St Louis (international scholar and recipient of Monash Block Grant Scholarship).
- Mohammed Aburumman was awarded a Research Training Program scholarship.
- Five students completed and graduated in 2017: Jonny Kuo, Maggie Trotter, Tim Lathlean, Amanda Warmerdam, Saraswathy Venkataraman (Monash Malaysia).
- Our students, including PhD and MPhil students, contributed to 18 published journal articles during 2017.
- Four students submitted their theses: Maatje Scheepers, Steve O’Hern, Dudley McArdle, Alison Muhnison (international).
- In the Three Minute Thesis, Jianrong Qui was the winner of the MUARC competition, and went on to represent MUARC in the Monash University finals.
- Mohammed Aburumman was selected as the Student Representative on the Board of the Australasian Injury Prevention Network.
- Successful milestones completions: Confirmation of Candidature (9), Mid Candidature Review (3), Pre-Submission Seminars (5).
- The MUARC Vacation student program was also successful in 2017, attracting four 2016/17 and seven 2017/18 summer and 1 winter scholarship recipients.
- Honours students – 1 (final year Physiotherapy Honours student)

Other highlights

MUARC’s second Graduate Research Workshop was run in 2017. Students engaged in interactive presentations on writing skills, library searches, study design and research methods, and implementation science as well as writing sessions.

“Studying at MUARC is great. There are lots of opportunities to develop skills to help us with our PhDs. Students can attend writing workshops, study design and data analysis seminars and journal club meetings. MUARC also has a number of social events throughout the year for students and staff to get together, making sure we all feel involved in the centre.”

HAYLEY MCDONALD — PHD STUDENT
‘THE CONTRIBUTION OF DRUGS AND ALCOHOL IN SERIOUS INJURY CRASHES’
Front: MS THARANGA (TARA) FERNANDO PhD Candidate
MS HAYLEY MCDONALD PhD Candidate
MS JIANRONG QIU PhD Candidate
MS RENEE ST. LOUIS PhD Candidate
MR BRENDAN LAWRENCE PhD Candidate
MS ANGELA CLAPPERTON PhD Candidate
Back: ASSOCIATE PROFESSOR JENNIE OXLEY
Associate Director, Graduate Research
MR NEBOJSA TOMASEVIC PhD Candidate
MS SUZANNE CROSS PhD Candidate
MR MOHAMMED ABURUMMAN PhD Candidate
## PHDS AND MPHILS

### Transport Safety

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<td>Criteria for child safety features in vehicle.</td>
<td>Sjaan Koppel</td>
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<td>Samantha Buckis</td>
<td>Young drivers and crash risk factors – event data recorders shedding new light on speeding behaviour.</td>
<td>Michael Fitzharris</td>
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<td>Nimmi Candappa</td>
<td>Understanding the crash dynamics of wire rope barrier in the context of Safe System ideals.</td>
<td>Brian Fildes</td>
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<td>Belinda Clark</td>
<td>Unlicensed driving in Australia.</td>
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<td>Suzanne Cross</td>
<td>Children in Cars: the role of in-vehicle behaviour in child occupant protection.</td>
<td>Jude Charlton</td>
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<td>Angelo D’Elia</td>
<td>A data system framework for road safety research with applications.</td>
<td>Stuart Newstead</td>
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<td>Mohammad Ibrahim</td>
<td>Scientific approach for road safety strategy framework.</td>
<td>Brian Fildes</td>
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<td>Brendan Lawrence</td>
<td>Understanding the nature of unreported bicycle incidents.</td>
<td>Jennie Oxley</td>
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<td>Hayley McDonald</td>
<td>The contribution of drugs and alcohol in serious injury crashes.</td>
<td>Janneke Berecki-Gisolf</td>
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<td>Steven O’Hern</td>
<td>Evaluation of evidence-based infrastructure for safer cycling.</td>
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<td>Exploring the road safety impacts of bus safety inspections.</td>
<td>David Logan</td>
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<td>Renee St. Louis</td>
<td>Impact of changes in health and functional impairments on driving patterns of older adults.</td>
<td>Jude Charlton</td>
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<td>Nebojsa Tomasevic</td>
<td>Investigation of transfer control from automated vehicles to the driver.</td>
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<td>Jessica Truong</td>
<td>Safe systems and safety culture – How to move Towards Zero.</td>
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<td>Luke Valenza</td>
<td>Older passengers and falls in trams.</td>
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<td>Mohammed Aburumman</td>
<td>A safety culture translation toolkit: Guiding industry in creating a safer working environment.</td>
<td>Sharon Newnam</td>
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<tr>
<td>Ivan Cikara</td>
<td>Has the ‘Chain of Responsibility’ legislation improved road transport safety?</td>
<td>Sharon Newnam</td>
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<td>Sarah-Louise Donovan</td>
<td>Safety Culture and leadership: Examining the influences for improved safety outcomes in high risk organisations.</td>
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<td>Maatje Scheepers</td>
<td>Evaluation of a psychosocial screen in a large injury compensation organisation.</td>
<td>Di Sheppard</td>
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<td>Raphaela Schnittker</td>
<td>Application of cognitive systems engineering in anaesthesia: Developing and evaluating a decision-making support tool for airway management.</td>
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<td>Amanda Warmerdam</td>
<td>Work-related driver safety: A multi-level investigation.</td>
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### Safety in the Home and Community

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<td>Janne Bowen</td>
<td>Building and strengthening resilience in communities prior to emergencies.</td>
<td>Frank Archer</td>
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<tr>
<td>Joanne Briggs</td>
<td>Quality project evaluation of the Army Aboriginal Community Assistance Program from a military participant perspective.</td>
<td>Frank Archer</td>
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<td>Angela Clapperton</td>
<td>Victorian suicides: Investigating the presence and nature of mental illness and exploring pathways to suicide.</td>
<td>Stuart Newstead</td>
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<td>John Coleman</td>
<td>Does collaborative planning for general practices contribute to a more resilient emergency response?</td>
<td>Frank Archer</td>
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<td>Joseph Cuthbertson</td>
<td>Disaster risk and the social determinants of health.</td>
<td>Frank Archer</td>
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<td>Susan Davie</td>
<td>How prepared is Australia to protect children in emergencies?</td>
<td>Frank Archer</td>
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<td>Craig Ferguson</td>
<td>Recent major natural disasters have identified inadequacies in crisis leadership at the incident control level.</td>
<td>Frank Archer</td>
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<td>Tharanga Fernando</td>
<td>The injury comorbidity index study.</td>
<td>Janneke Berecki-Gisolf</td>
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<td>Frances Haire</td>
<td>Analysing perceptions of floods in Australia to inform behaviour change.</td>
<td>Frank Archer</td>
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<td>Roger Jones</td>
<td>Developing a practical tool to help individuals and communities in assessing and managing emergency risk.</td>
<td>Frank Archer</td>
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<td>Ravathi Krishna</td>
<td>A cross cultural comparison of Child Centred Disaster Risk Reduction (CC-DRR) strategies in India and Australia.</td>
<td>Eva Alisic</td>
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<td>Tim Lathlean</td>
<td>Training loads, player wellness and injury risk in elite junior Australian football players.</td>
<td>Caroline Finch</td>
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<td>Dudley McArdirle</td>
<td>Australia’s emergency managers – towards professionalisation.</td>
<td>Frank Archer</td>
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<td>Heather Moody</td>
<td>Humanitarian guidelines and frameworks within the Australian disaster management context.</td>
<td>Caroline Spencer</td>
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<td>Bianca Olstein</td>
<td>A comparative study of the emergency response to mass casualty incidents and disasters between Israel and Australia.</td>
<td>Frank Archer</td>
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<td>Matthew Pepper</td>
<td>Disaster resilience and emergency response.</td>
<td>Frank Archer</td>
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<td>Suresh Pokharel</td>
<td>Multiple stresses and urban vulnerability: Why and how building resiliency should be a focus.</td>
<td>Frank Archer</td>
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<td>Mark Potter</td>
<td>Examining the response and recovery interface with the aim of improving community resilience.</td>
<td>Frank Archer</td>
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<td>Adam Poulter</td>
<td>Professionalisation of the international humanitarian workforce – what are the barriers and opportunities.</td>
<td>Frank Archer</td>
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<td>Fiona Roberts</td>
<td>Investigation into measuring Disaster Resilience and Recovery.</td>
<td>Frank Archer</td>
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<td>Kate White</td>
<td>An investigation of the changing nature of ‘community resilience’ as a contemporary issue in the Victorian emergency management sector for shared understanding and shared responsibility.</td>
<td>Frank Archer</td>
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<td>Diana Wong</td>
<td>Disaster Health Evaluation.</td>
<td>Caroline Spencer</td>
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REGULATION AND IN-DEPTH CRASH INVESTIGATION

The Regulation and In-Depth Crash Investigation (RICI) team is interested in matters relating to road and vehicle safety regulations; we consider how decisions are made, formulated and supported through evidence-based science. Our unit, led by Associate Professor Michael Fitzharris, creates comprehensive in-depth crash data, in addition to data from hospitals, police and compensation systems to identify safety concerns.

In 2017, RICI concentrated on several research projects addressing numerous road safety issues within five specific themes:

- Alcohol and drug-driving
- Driver behaviour: anger, aggression and speed
- Motorcycle safety research
- Technology to address driver fatigue and distraction

New projects in 2017

Analysis of crashes on Transurban Roads
We were commissioned by Transurban to examine the road safety performance, with respect to crashes, of roads owned and operated by the company. The study will examine crash data across three states: Victoria, New South Wales and Queensland. We expect to have results ready in 2018.

Monash Alfred Injury Network collaboration
We led the development of a project aimed at improving post-crash survival outcomes by optimising acute emergency care systems, which is a partnership with the Monash Alfred Injury Network (MAIN).

Funded by the Monash University Interdisciplinary Research grant scheme, the work will focus on identifying how crash notification technology and acute care can be optimised so as to provide people injured in road crashes the best chance for survival and recovery.

The project involves a desktop review of key elements of post-crash trauma care systems, and will then document practices in Australia, Vietnam, Malaysia, India and Myanmar. The overarching goal is to identify how improvements in post-crash care can be implemented with a view to reducing the number of deaths in these countries.

The project will begin in earnest in 2018. It involves partners from the School of Public Health and Preventive Medicine (Professor Peter Cameron), Department of Surgery, Central Clinical School, The Alfred (Professor Mark Fitzgerald), Department of Community Emergency Health and Paramedic Practice (Associate Professor Brett Williams), and MUARC (Professor Jude Charlton and Associate Professor Fitzharris).

Achievements
Dr Sara Liu was awarded her DPsyCh (Clinical), and was ratified as a Registered Clinical Psychologist by the Australian Health Practitioner Regulation Agency. Congratulations to Sara.
Driving under the influence of alcohol and drugs
The first of our five major themes for 2017 was alcohol and drug-driving, and we performed significant research work in this area.

Drug-driving
In the field of drug-driving, we continued our study called Drug-driving: improving our understanding of risk and motivation for driving after use of illicit substances. The project is funded under the MUARC Baseline program.

In 2017, we continued to focus on a review of current literature on drug-driving and crash risks. We also conducted interviews with specialists in the drug and alcohol field in metropolitan and rural Victoria on issues surrounding drug-driving behaviour, with a view to prevention.

We updated our analysis of drug-driving data, including research on the driving behaviour of known drug-using groups through our collaboration with Professor Paul Dietze with specialists in the drug and alcohol field in metropolitan for driving after use of illicit substances. The project is funded Drug-driving: improving our understanding of risk and motivation for driving under the influence of alcohol and drugs.

Our work in this area continues in 2018, as we prepare for a Victoria-wide Alcohol, illicit drug and prescription medication survey.

Alcohol and drink-driving behaviour
The team explored a range of issues concerning alcohol consumption patterns and drink-driving, with an emphasis on the acceptability of alcohol interlock systems.

We undertook research into drinking patterns, including alcohol dependency and binge-drinking, and drink-driving related risks.

We presented at conferences and published a number of papers on this topic, which appeared in Accident Analysis and Prevention as well as Australasian Road Safety Conference.

Driver behaviour: driver anger, aggression, speed and mindfulness

Driver aggression and speed
We continued our research into driver behaviour, using community-based survey data to concentrate particularly on aggression and speed.

Members of our team presented a paper at the Australasian Road Safety conference in Perth. In this paper, we reported on data from a national survey conducted in 2014 pertaining to the prevalence of self-reported aggressive behaviours, taken from the Driver Behaviour Questionnaire. This research generated considerable media attention – it was reported in The Age, Practical Motoring, The West Australian and on ABC News Breakfast, 3AW breakfast, ABC Goulburn Murray, The Project, Channel 7 News, Channel 9 News, Channel 10 News, news.com.au, ABC Radio Sydney and in or on various other print and broadcast media.

Our research also examined speed compliance and speed-related behaviour across Australia and three RICI team members had their work on the subject published in Accident Analysis and Prevention in 2017.

International partnerships
Collaborative research into angry and aggressive driving continued in 2017 with international collaborators from Cranfield University in the UK, Middle East Technical University in Cyprus and the French Armed Forces Biomedical Research Institute in France.

This work focused on individual characteristics associated with self-reported angry and aggressive driving, such as gender roles and appraisal tendencies. We collected data from drivers in Ukraine and France and the study resulted in three publications: ‘Driver anger in France: the relationships between sex, gender roles, trait and state driving anger and appraisals made while driving’, ‘Gender roles, sex and the expression of driving anger, and ‘Gender roles and the expression of driving anger among Ukrainian drivers’.

Mindfulness and driving
Our team began an involvement in the mindfulness and driving project, which commenced in 2017. Led by Dr Sjaan Koppel from the Behavioural Science for Transport Safety unit at MUARC, the collaboration also involves Dr Amanda Stephens (RICI), Kristie Young (Human Factors), Dr Craig Hassed and Dr Richard Chambers.

We conducted a survey investigating the relationships between mindfulness practices and aberrant driving behaviours. The results showed that increased mindfulness is associated with reductions in driving anger, aggression and distraction. One paper from this project – ‘What is the relationship between aberrant driving behaviours, mindfulness and self-reported crashes and infringements?’ – has been accepted for publication in Traffic Injury Prevention and two further papers are under review.

This program is being developed further through the award of MUARC seed funding. This will facilitate development of an ARC linkage proposal to explore the associations between mindfulness practices and driving behaviour, aggression and distraction in simulated and real-world conditions.

Motorcycle research
Our collaboration with Dr Julie Brown at Neuroscience Research Australia (NeuRA) on the safety of motorcycle clothing continued. This work focused on assessment protocols for motorcycle clothing standards, and resulted in two published papers, in The Journal of Safety Research and Traffic Injury Prevention.

Following the AustRoads Motorcycle In-depth Crash Study led by NeuRA, research continued into rider behaviour, risk factors and crashes. This led to the publication of a paper in Accident Analysis and Prevention. The study found that, overall, riders reported relatively safe behaviours; they frequently used protective gear and infrequently engaged in aberrant behaviour. However, even though infrequent, violations of speed and errors related to control of the motorcycle increased the risk of having a near crash, and performing stunt-type behaviours was clearly associated with crashes. This work points to a range of interventions needed to improve the safety of motorcycles and reduce involvement in crashes.
Research on our Australian Research Council Discovery motorcycle protective equipment program intensified in 2017. After an upgrade to the MUARC motorcycle simulator, we conducted an experiment to assess the effects of heat stress on motorcycle performance and safety with ten motorcycle riders. The riders were tested on two occasions, first with normal gear and temperature, then for 60 minutes at temperatures 1.5 degrees warmer. Analysis will continue in 2018 and will focus on any safety-related performance decrements.

MUARC continues to participate in the multi-year EU COST Action, known as SafeTwoWheelers. Meetings were held throughout the year in Europe. Joint work with Associate Professor Julie Brown and Dr Lauren Meredith from NeuRA and Professor Nigel Taylor from the University of Wollongong on Motorcycle protective clothing, crash protection, thermal strain and rider performance was presented at the Safe2Wheelers workshop on protective garments held in Plzen the Czech Republic.

Driver fatigue and distraction

In 2016 we entered into partnership with Seeing Machines, a Canberra-based company focussed on creating state-of-the-art driver monitoring systems. Seeing Machines technology assesses driver fatigue and distraction in real-time. MUARC worked with Seeing Machines on two collaborative programs in 2017:

In-vehicle technology and the assessment of driver fatigue

Seeing Machines commissioned MUARC to conduct an evaluation of the effectiveness of the real-world performance of their driver-state monitoring system fitted to vehicles in a large-scale commercial transport fleet in Australia. Using five years of data, the research highlighted the benefits of providing real-time feedback to drivers, and to the company itself. Reductions in the rate of fatigue events in excess of 90 percent were found. Drivers had fewer fatigue events, and when they did occur they were of shorter duration. They also occurred much later into each trip.

The findings of the research were presented by Associate Professor Michael Fitzharris at the 25th International Technical Conference on the Enhanced Safety of Vehicles in Detroit (USA) in June 2017. A team of our researchers also published a paper in Traffic Injury Prevention: ‘The relative importance of real-time in-cab and external feedback in managing fatigue in real-world commercial transport operations’.

Development of driver state sensing systems

The Advanced Safe Truck Concept, funded under the Australian Government Cooperative Research Centres Programmes, commenced in earnest. The project is a partnership involving Seeing Machines, Ron Finemore Transport and MUARC – including RICI and the Human Factors team. In late 2017, Volvo Trucks Australia joined the consortium. Program management meetings rotated through Canberra, Wodonga and Melbourne.

The program has a number of elements. In 2017, literature reviews were completed on state-of-the-art assessment of driver fatigue, distraction and workload. At the same time, the program team developed a driver state monitoring system that incorporates an assessment of driver physiology and other measures. The monitoring platform integrates multiple technologies, including wearables. The goal is to monitor the driver in a rested and a fatigued state with a view to identifying early indications of fatigue. Safety performance is concurrently assessed using MUARC’s advanced car driving simulator facility, as well as Australia’s first truck simulator.

A presentation was given about the program at the Australian Road Safety Conference in Perth.

Technical work commenced on the rollout of the technology in Australia’s first on-road naturalistic truck study. This program is ongoing and will continue through to 2019.
Enhanced Crash Investigation Study – continued progress

Led by Chief Investigator Associate Professor Michael Fitzharris, the Enhanced Crash Investigation Study (ECIS) seeks to provide the Transport Accident Commission (TAC) with evidence-based road safety countermeasure options. Our overarching aim is to target and reduce the number of serious injury crashes in Victoria.

Our team comprises Australian-based Investigators Professor Mike Lenné and Dr Bruce Corben, while international Investigators include Associate Professor Diana Bowman from Arizona State University in the USA, Professor Andrew Morris from Loughborough University in the UK and Professor Clay Gabler from Virginia Tech in the USA.

In 2017 we focused on case closure and data validation for all 408 cases in the study. This brought a significant element of the study to an end and, in January 2018, we said farewell to a number of members of the team who made an invaluable contribution in this area:

- Mr Robin Jackel (Control sites)
- Mr Rai Curry (Crash vehicle inspector)
- Mr Geoff Rayner (Crash vehicle inspector)
- Miss Nicola Elliott (Research Nurse)
- Miss Kathryn Joseph (Research Nurse)
- Miss Karen Vlok (Research Nurse)
- Mrs Debra Judd (Data Officer)
- Mr Paul Ribas (Data Officer)

We thank them greatly for their enormously important work.
ECIS crash reconstruction work

The reconstruction of the real-world ECIS crashes continued, with a focus on understanding crash dynamics and impact speed. The team has significant technical capacity in the use of CAD software (Rhinoceros 5 and MicroStation V8i) and crash reconstruction software (PC-Crash and HVE), allowing robust crash reconstructions to be performed on each case.

Significant work on ensuring our methods are state-of-the-art was undertaken. A significant report on the validation of our methods against data captured from vehicle ‘black boxes’, or Event Data Recorders (EDRs), was finalised. This ensures our crash reconstruction methods are validated against gold standard measures.

An example of the practical application of our work is seen through examining alternative intersection treatments at rural cross-roads. This work focused on improving safety at intersections through design modifications and assessing the impacts of different speed limits.

MUARC collaborations on published research papers

During the year, ECIS partnered with other MUARC units, as well as institutions and organisations outside Monash University, to conduct research and produce research papers:

Behavioural Science for Transport Safety team
Dr Stephens worked in collaboration with the Behavioural Science team and used longitudinal data from the Driver Behaviour Questionnaire to examine older drivers participating in the Ozcandrive study. The research was published in Accident, Analysis and Prevention.

Human Factors in Transport and Workplace Safety team
Dr Stephens worked in collaboration with the Human Factors team and published data from two projects which have now ended. These were the simulator component of the VicRoads Intersection design study as well as the iOM roadside advertising study. The work resulted in two published papers, one in Accident Analysis and Prevention and another in Applied Ergonomics.

Interstate and international collaboration
Dr Stephens also continued to work in partnership with researchers from outside Monash and outside Australia. In 2017 two papers were published representing these collaborative efforts with partners from Cairnmillar Institute, Australian Catholic University, Massy University (New Zealand) and Nottingham Trent University (UK). They were published in Ergonomics and Traffic Injury Prevention respectively.

External engagement

Our team was engaged in a number of other activities, throughout Australia and the world:

- We provided technical inputs into the Motor Vehicle Accident Fund of Namibia through their 2015 MVA Fund Annual Crash Report.
- Associate Professor Fitzharris:
  - Presented an invited workshop on Safe Systems to the Queensland Department of Transport and Main Roads, held in Brisbane.
  - Presented at the 2017 Road Policing Intelligence Forum on the subject of behavioural issues in driving and crash risk.
  - Was an invited speaker at MediaCom’s ComX, an event covering technology, innovation and creativity.
  - Participated in the World Health Organization Western Pacific Region Enforcement Training Program, delivered by MUARC. The subject was alcohol interlocks, drug driving crash risks and enforcement.
  - Presented at the MUARC Road Safety Management Leadership Programs (held in May and November), on the topic of insurance compensation schemes and road safety investment.
- We engaged with Victoria Police on heavy vehicle safety and road policing strategy in the areas of heavy vehicle safety, and on projects such as the Victoria Police Centre, World Trade Centre, Optimisation of Victoria Police Road Policing Service Delivery Model and the Victoria Police Complex.
ROAD SAFETY MANAGEMENT LEADERSHIP PROGRAM

Since its inception in 2012, MUARC’s Road Safety Management Leadership Program has helped to develop and nurture the next generation of road safety leaders. Program participants include senior managers from national and international road agencies, as well as government and police organisations whose challenge will be to achieve improvements in road safety performance over the coming decades.

Over the last six years, MUARC has trained more than 176 program participants from all over Australia and the world.

In 2017, the Program was offered in both May and November at Monash facilities in Melbourne’s CBD. MUARC hosted senior professionals from road safety agencies in Indonesia and South Africa, alongside members of the Victoria and Western Australian Police, the Commonwealth Department of Infrastructure and Regional Development, the Queensland Department of Transport and Main Roads, VicRoads and the Transport Accident Commission.

The Program draws on the expertise of the Monash research team as well as its strong partnerships. Participants gain from the insights of leading global specialists in various fields from the University of Adelaide’s Centre for Automotive Research and Australian Road Research Board, and the Melbourne Business School.

Content of this year’s Programs addressed the road safety challenges faced by leaders across the globe. Presenters with extensive international experience offered formal presentations and interactive case studies, and participants engaged in work and panel discussions conducted over five days.

Among the many topics covered by the Program were:

- safe roads and roadsides
- safe speeds
- safe vehicles
- deterrence and enforcement
- road user behaviour
- leadership challenges in road safety management.

Participants were asked to consider questions related to each topic, among them:

- “What progress is your organisation making in this area?”
- “What are the best opportunities that exist now, or that you could work towards?”
- “What do you need in order to take these opportunities?”
- “What are the biggest barriers to success?”
- “How can these barriers be overcome?”

The Program challenged participants to consider not only the science that underpins road safety solutions but also the leadership implications for implementing strategies.

“It’s been really great. The diversity, different cultures and different people who have come together from the different agencies – and how we all face similar problems and how it’s so essential that we are co-dependent on each other to get the outcomes that we need – it’s been really highlighted. That’s just been the single greatest take away for me.”

“The latest research and the contemporary issues in relation to enforcement, and the safe systems and how we can directly influence a lot of our partners, from a policing perspective has been really, really important. It also enables me to provide that evidence-based research to back-up that influence. I think that’s the biggest thing I’ll take away and share with a lot of my partners.”

“I would suggest and recommend that anybody in this field in a leadership role should definitely attend. They will take back information that will help them save people’s lives.”

NARELLE BEER — VICTORIA POLICE SUPERINTENDENT

“It’s really good to see a broad, cross-section of different organisations with road safety at the forefront of their minds not just learning about the safe system approach, but learning how to spread that knowledge amongst our own workplaces and influence others.”

“For me personally, the adaptive leadership process was quite enlightening and something that I think I’ll be able to take back and use in my workplace in a number of different aspects.”

“For people that haven’t had exposure to safe systems, how it works and what the benefits of it are, I would highly recommend that they come and do this program.”

RYAN IRWIN — VICTORIA POLICE INSPECTOR
“It’s been great so far. Lots of information… just eye-opening.”

“My goodness, every day I take something new away. There’s a lot, there’s really a lot. We deal mainly with changing road-user behaviour in my specific area of business, so it’s just a different approach to thinking about road-user behaviour and the techniques one can use in changing road-user behaviour. It’s a lot broader than what we’ve been looking at up to now. So that’s definitely something I’ll take back with me. In general, the thinking about the whole safe systems concept and road safety…it’s just a different way of thinking.”

MS PALESA MOALUSI — ROAD TRAFFIC INFRINGEMENT AGENCY, SOUTH AFRICA

“The program was very good. It’s good to learn about the concerns of delegates from other countries. The safe system approach is an eye-opener for them. We in VicRoads have already started taking the safe system approach on board, however, the program has provided a lot of additional valuable information to us.”

AURA DIMACALI — SENIOR PROJECT DEVELOPMENT OFFICER, METROPOLITAN NORTH WEST REGION, VICROADS
The Traffic Engineering and Vehicle Safety (TEVS) Consortium is made up primarily of research engineers with industry and academic experience in civil and mechanical engineering, as well as safe behaviour. The group comprises Professor Brian Fildes, Dr David Logan and a number of PhD engineers, namely Nimmi Candappa, Brendan Lawrence, Steve O’Hern, Mohammad Nabil Ibrahim, Inam Ahmad, Nebojsa Tomasevic, Mohammed Aburumman and Jianrong (Jocelyn) Qiu.

Supervisors are also key observers within the group, and include Professor Tim Horberry, Associate Professor Jennie Oxley, Dr Sharon Newnam and Dr Sjaan Koppel. The group’s work focuses on the development and evaluation of safe road infrastructure, vehicle design and maintenance, transport modal choice, workplace safety, autonomous vehicles and child restraint.

Industry collaboration
TEVS has been active in project work and in collaborating with industry throughout 2017. Dr David Logan continued his work on road safety strategy modelling for VicRoads and the Transport Accident Commission (TAC) as part of the Towards ZERO action plan. TEVS researchers also assisted the TAC on its safety promotion and completed Advanced Driver Assistance System evaluations for Austroads, VicRoads and Euro NCAP (New Car Assessment Programme).

The group completed their work on the feasibility of the future of private transport in Australia. The project was a Monash Infrastructure collaboration led by TEVS with other Monash partners from MUARC, the Monash Institute of Transport Studies, Monash Art Design & Architecture, Monash Sustainability Institute (ClimateWorks), SensiLab, and the Monash Faculty of Law. The report from this research outlines a series of priority research issues in future vehicle technology.

International research
Previous research in vehicle safety in the UAE conducted by members of TEVS examined the extent of severe crashes by mini-buses in that region and what could be done to improve safety. As a consequence, a new set of vehicle standards were developed for new mini-buses and introduced in the UAE and associated regions early in 2017. While a full evaluation of the impact of these standards is still required, early local reports suggest significant improvements in the safety of these vehicles have been achieved already as a consequence of the research.

Student Research Programs
Cyclist are involved in a growing number of severe injury crashes. Students Steve O’Hern and Brendan Lawrence finalised their research programs in bicycle safety under the guidance of Jennie Oxley and others during 2017. This work included an on-road study of cyclist behaviour as well as the development of simulation capabilities for cyclists.

Wire rope barriers
Research on Wire Rope Barriers in 2017 by the TEVS team showed that wire rope barriers could prevent 87% reductions in the risk of both serious injuries and death. Subsequently, the TAC and VicRoads’ Safe System Road Infrastructure Program are now rolling out wire rope barriers along Victoria’s high-risk rural roads. An in-depth study of injuries from motorists involved in runoff the road collisions with WRB is the focus of research by Nimmi Candappa in her PhD studies program.

External engagement
Professor Fildes continued his work as a committee member of the Camera Commissioner’s Reference group, the Australian Automotive Research Centre test track development Committee, and as a Visiting Professor at Loughborough University in the UK.
VICTORIAN INJURY SURVEILLANCE UNIT

Members of the Victorian Injury Surveillance Unit (VISU) analyse, interpret and disseminate data relating to the state’s injury-related deaths, hospital admissions and emergency department presentations. These data, which are critical in the prevention of injuries and promotion of safety, are used by government to underpin injury prevention policies and stimulate research. They also prove vital when it comes to developing and evaluating prevention strategies and measures.

The unit also releases data and separate reports for professional and community audiences, including other government departments and agencies of all levels, health and injury prevention organisations, media, business and industry, education institutions, as well as research groups. VISU is supported by the Victorian Government. The Victorian Department of Health and Human Services receives quarterly reports from VISU.

Welcome to Himalaya Singh

In 2017, the unit was joined by Himalaya Singh, a PhD candidate studying with Professor Caroline Finch at Federation University. At VISU, he commenced a project to develop online maps of hospital-treated injury incidence in Victoria, and an online table generator for Victorian hospital-treated injury statistics. Once the project is completed in early to mid 2019, these resources will be publicly available through the MUARC website.

15th VISU E-bulletin – Victorian hospital-treated injury, 2015/16

In early 2017, VISU published the 15th e-bulletin in a series that provides an overview of Victoria’s injury profile. The publication looked at data from the state in 2015/16, during which time there were 103,651 hospital admissions and 320,150 emergency department (ED) presentations for unintentional injury in Victoria. Among the significant findings were:

- In 2015/16 males were overrepresented in hospital-treated injury cases, accounting for 55% of admissions and 58% of ED presentations.
- Falls were the leading cause of injury among admissions and ED presentations, accounting for 46% of admissions and 37% of ED presentations.
- The home was the most common setting for injury among admissions and ED presentations: 26% of hospital admissions and 40% of ED presentations.
- A fracture to an upper limb was the most common injury for both admissions (18%) and ED presentations (12%).

16th VISU E-bulletin – Victorian injury deaths, 2013 to 2015

Later in 2016, VISU published the 16th edition of the e-bulletin, which focused on injury deaths in Victoria between 2013 and 2015. In this three-year period 7,092 Victorians died as a result of injury. The majority of these deaths were unintentional (just under 70%, n=4,949), just under 28% were intentional (1,962 suicide deaths and 143 homicide deaths) and the remaining 2.6% were classified as undetermined intent (n=181). Listed below is a summary of the central findings from the report:

- The overall average annual injury death rate was 40.5 per 100,000 population.
- Males were overrepresented, accounting for 56% of unintentional injury deaths, 75% of intentional injury deaths and 70% of injury deaths with undetermined intent.
- Three causes combined – falls (35%), suicide (26%) and transport (13%) – accounted for approximately three quarters (74%) of injury deaths.
Hazard – Issues in injury and injury prevention

For almost as long as MUARC has existed, VISU has been publishing Hazard, a publication offering analysis of major or emerging issues in the field of injury and injury prevention.

Issue 83 – Intentional injury

Hazard 83, released in December 2017, concentrated on all intentional injuries, including suicide deaths, hospital treated intentional self-harm injury, assault deaths and hospital treated assault injury. The publication, which focused on persons aged 15 years and over, reported that:

• There were 348 assault-related deaths in this age group in Victoria, 2006/7 to 2013/14, an average of 44 per year.
• In 2013/14 to 2015/16, there were 3,294 assault-related injury admissions per year; 74% were males.
• Male assault injuries were commonly caused by an unspecified person (51% of cases) whereas female assault injuries were commonly caused by a current or former spouse or partner (43% of cases).
• There were 4,371 suicides among persons aged 15 years and over in Victoria between 2006/7 and 2013/14, an average of 546 per year.
• Between 2013/14 and 2015/16, there were 15,921 self-harm related injury admissions per year; 67% were females.
• The most common mechanism of self-harm was poisoning by pharmaceuticals, which accounted for 76% of cases.

Acquired brain injury and family violence

VISU contributed to quantitative analysis of population health datasets for a project led by Brain Injury Australia and funded by the Victorian Department of Health and Human Services. ‘Prevalence of Acquired Brain Injury as a Result of Family Violence’ will be finalised in early 2018; during 2017, Professor Belinda Gabbe of Monash University directed and coordinated the analysis side of the research. VISU provided data on hospital-treated, family violence-related injury in Victoria from 2006/07 to 2015/16, this analysis was based on hospital admissions and emergency department presentations.

An analysis of transport injuries

In 2017, VISU worked with Transport Safety Victoria (TSV) on a project called ‘Transport-related non-fatal hospitalisation data analysis’. The study involved analysis of bus, tram and marine injuries based on emergency department injury presentations data, hospital admissions data and information from the Maritime Incident Database held by TSV.

The reports are available on the TSV website (transportsafety.vic.gov.au).

Better understanding building failures

On behalf of the Victorian Building Authority (VBA), the unit carried out research into hospital-treated injury resulting from structural failures in buildings. The research also encompassed a literature review and analysis of the VCAT building list led by Dr Genevieve Grant from Monash University’s Faculty of Law.

The project culminated in a report, which was delivered in February 2017; the VISU section of the report was authored by Voula Stathakis (VISU).

The purpose of the project was to allow VBA to better understand how building failures affected safety and injury; this will help them to gain an in-depth understanding of causes of building failures and related factors in the design and construction process.

The Injury Comorbidity Index Study – a PhD project

In September 2016, Tharanga (Tara) Fernando commenced her PhD work on the data linkage project titled ‘The Injury Comorbidity Index Study’. The study involves bringing together hospital treated injury and death data. The study progressed well in 2017; the Victorian and New South Wales linked datasets were both obtained. The data linkage application to Western Australia was successful and an ethics application has been submitted.

The research is important for many reasons, chief among them because chronic disease can delay recovery from injury and increase the risk of complications and death. The results from the project will help clinicians to better understand the influence of comorbidity on injury outcomes. It will make it easier to give injury prognoses and estimate recovery time, and to develop strategies to prevent injury complications among those at risk.

Tara was successfully confirmed for her PhD candidature in August 2017.

Journal articles and conference presentations

Three journal articles incorporating VISU data were published in 2017:


The Australian Injury Prevention Network Conference was held in Ballarat towards the end of 2017. Members of the VISU team made six presentations at the event:

• Tharanga Fernando presented ‘Sports injury in Victoria, Australia 2012/13 to 2014/15: evidence from Emergency Department records’.
• Angela Clapperton presented ‘Hospital-treated self-harm among adults in Victoria: Patterns and increasing trends 2006/07 to 2015/16’.
• Janneke Berecki-Gisolf presented ‘Trends in injury-related hospital admissions 2006/07 to 2015/16 in Victoria, Australia: Administrative data artefact or injury epidemic?’.
• Voula Stathakis presented ‘Hospital treated injuries resulting from structural failures in buildings: Emergency Department data analysis’ as well as ‘Chronic disease prevalence in a cohort of injured workers in Victoria, Australia: using hospital data linkage to determine pre-injury health’.
• Adrian Laughlin presented ‘A comparison of rates and patterns of non-fatal assault-related hospital admissions among residents of metropolitan Melbourne and regional rural Victoria’.

Voula’s presentation on structural failures in buildings won the Best Rapid Oral Presentation award at the conference.
# STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR
# ENDED 31 DECEMBER 2017

<table>
<thead>
<tr>
<th>Notes</th>
<th>$000's</th>
<th>$000's</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPENING BALANCE AT 1 JANUARY 2017</td>
<td></td>
<td>4,166</td>
</tr>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Research Council</td>
<td></td>
<td>151</td>
</tr>
<tr>
<td>National Health and Medical Research Council</td>
<td></td>
<td>110</td>
</tr>
<tr>
<td>Commonwealth Government - Others</td>
<td></td>
<td>43</td>
</tr>
<tr>
<td>State and Local Government</td>
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<td>2,502</td>
</tr>
<tr>
<td>Co-operative Research Centres</td>
<td></td>
<td>204</td>
</tr>
<tr>
<td>Industry Australia</td>
<td></td>
<td>577</td>
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<tr>
<td>Industry International</td>
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<td>156</td>
</tr>
<tr>
<td>Total Research</td>
<td></td>
<td>3,743</td>
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<tr>
<td>Commercial</td>
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<td>674</td>
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<tr>
<td>Other income</td>
<td></td>
<td>388</td>
</tr>
<tr>
<td>Monash contribution</td>
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<td>4,178</td>
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<tr>
<td>Total Income</td>
<td></td>
<td>11,215</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
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<td></td>
</tr>
<tr>
<td>Salaries and Related Expenditure</td>
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<td>5,526</td>
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<tr>
<td>Financial and Administration</td>
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<td>242</td>
</tr>
<tr>
<td>Student Related</td>
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<td>185</td>
</tr>
<tr>
<td>Infrastructure Related</td>
<td></td>
<td>246</td>
</tr>
<tr>
<td>Central Support Services – Overhead Costs</td>
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<td>3,181</td>
</tr>
<tr>
<td>Other Operating Expenditure</td>
<td></td>
<td>1,140</td>
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<tr>
<td>Total Expenditure</td>
<td></td>
<td>10,520</td>
</tr>
<tr>
<td><strong>NET BALANCE FOR THE YEAR</strong></td>
<td></td>
<td>695</td>
</tr>
<tr>
<td>CLOSING BALANCE AT 31 DECEMBER 2017</td>
<td></td>
<td>4,861</td>
</tr>
</tbody>
</table>

Notes:
1. The University has provided a transfer of funds to cover the Central Support Services – Overhead Costs
2. Includes payments to consultants

The Institute’s Statement of Income and Expenditure has been certified to be in accordance with the University’s Accounting and Financial Reporting System by the Office of the Senior Vice-President and CFO. Where required as a condition of funding grants, accounts will be audited by independent external auditors. The Institute’s accounts have been subjected to Government audit as part of the University’s annual accounts for the calendar year 2017.

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Connie Mogg
Acting Director, Research and Revenue Accounting Services
Office of the Senior Vice-President and CFO