THE UNIVERSITY OF
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University

Key Centre Annual Report 2021

The Commonwealth Key Centre of Teaching and Research in Transport Management

Institute of Transport Studies
Monash University
https://www.monash.edu/engineering/its

Institute of Transport and Logistics Studies
The University of Sydney
http://sydney.edu.au/business/itls

Institute of Transport and Logistics Studies
University of Sydney Business School
The University of Sydney
NSW 2006

March 2022

Centres Coordinator
Australian Research Council
GPO Box 2702
Canberra ACT 2601

Dear Centres Coordinator,

I hereby present to you, in accordance with the Australian Research Council's requirements for continued Key Centre status, the report of the proceedings and outputs for the Commonwealth Key Centre of Teaching and Research in Transport Management (established 1995) for the year ended 31 December 2021.

Although the year has been greatly impacted by the COVID-19 pandemic, just like the previous year, the Centre has been extremely productive with successful ARC and CRC grants together with an increasing number of industry-linked research projects and consultancies. Our experts have been incredibly industrious in contributing to the current national and international narrative on how COVID-19 is impacting the transport and logistics spaces as well as contributing to increasingly important research activity on de-carbonisation of the transport sector and the circular economy, amongst other contributions. Our researchers continue to provide timely and engaging thought pieces and working papers, our modelling specialists are conducting travel surveys, academics are contributing to internal and external webinars as well as regular media appearances. In addition we are expanding our short course offerings, with new programs in 2021 such as the Travel Demand Management course with Transport for NSW and an infrastructure management short course designed for piloting in 2022.

ITLS Sydney celebrated its 30th year in 2020, a magnificent milestone for an Institute that continues to deliver high quality teaching and research resulting in increased impact beyond academia. Sadly, the planned celebration had to be postponed due to COVID-19, but it was finally held in May 2021 with 120 guests (including the Vice Chancellor) just before the next Sydney lockdown.

ITLS-Sydney was reviewed by the University in later 2021 in its other role as a University Centre with many accolades to reinforce its continuing role as a truly national centre of excellence and as a significant global player in our fields of expertise.

I want to thank Professor Geoff Rose who retired as Director of Monash ITS in 2021 and to acknowledge the huge contribution he has made over many years to our Centre. I welcome Professor Hai Vu as the new Director of Monash ITS.

I commend this Annual Report to all readers who will seek the breadth and depth of our contributions in this most challenging year.

Professor David Hensher

Key Centre Director
Director, Institute of Transport and Logistics Studies

Contents

Constitution

The primary object of the Key Centre is to undertake graduate teaching, executive programs, grant and contract research and development in the fields of transport, logistics and supply chain management studies.

The work of the Key Centre also has the following objectives:

— To provide a focus for University work in areas of transport and logistics management and to establish an ambience attractive to those committed to excellence in graduate transport, logistics and supply chain management programs and research.

— To collaborate, to the fullest extent possible, with other parties having an interest in transport, logistics and supply chain management studies and its applications.

— To offer specialised training courses, workshops, short courses and seminars on topics of interest in the area of transport, logistics and supply chain management.

— To seed the development, in Australia, of innovative ideas in transport, logistics and supply chain policy and professional practice in which the Key Centre plays a role.

These objectives are achieved by the Key Centre through:

— developing and offering graduate transport and logistics management programs, industry programs, certificates, executive programs and short courses;

— bringing high quality transport, logistics and supply chain management programs to people outside Sydney and Melbourne (both nationally and globally), as well as widening the offerings of courses within Melbourne and Sydney, through access to courses provided by both ITLS-Sydney and Monash ITS;

— contributing to Australia's growing participation in the Asia Pacific region in a leadership role in transport, logistics and supply chain management;

— widening the range of courses available for middle level professional managers in critical areas of transport, logistics and supply chain management not currently served;

— equipping managers in all disciplines (i.e., engineering, economics, planning), the small business sector and local government to succeed in the face of technological, economic and institutional change;

— building on the recognised need for stronger links between education of engineers, planners, policy analysts and managers in transport, logistics and supply chain management;

— undertaking research to develop state-of-the-art management practices and technical methods; and

— transferring the knowledge developed through research to client groups through the Key Centre's publications, workshops, conferences, seminars, and by participation in networks of transport, logistics and supply chain stakeholders.

ITLS Board of Advice

The ITLS **Board of Advice** actively supports the continued development and utilisation of ITLS as a centre of excellence adding value to the community. The academic and commercial membership of the Board gives a broad network for the sharing of expertise and experience. In 2021 we welcomed a number of new members and said farewell to some others.

New members

- Michael Kaine
  National Secretary, Transport Workers Union
- Marina Van Der Walt
  Deputy CEO and Head of Assurance, Infrastructure NSW
- Professor Hai Vu
  Director, Monash ITS

Retirements

- James Bushell
  HDR representative, ITLS
- Terry Papadis
  Manager, Training Solutions, GS1 Australia
- Professor Geoff Rose
  Monash ITS
- Stephen Rowe
  Director and Co-owner, Busways
- Mr Christopher Selth
  Director, Nexus Initiative Pty Ltd
- Clare Gardiner-Barnes
  infrastructure NSW
- Maryam Teymoury
  HDR Representative, ITLS
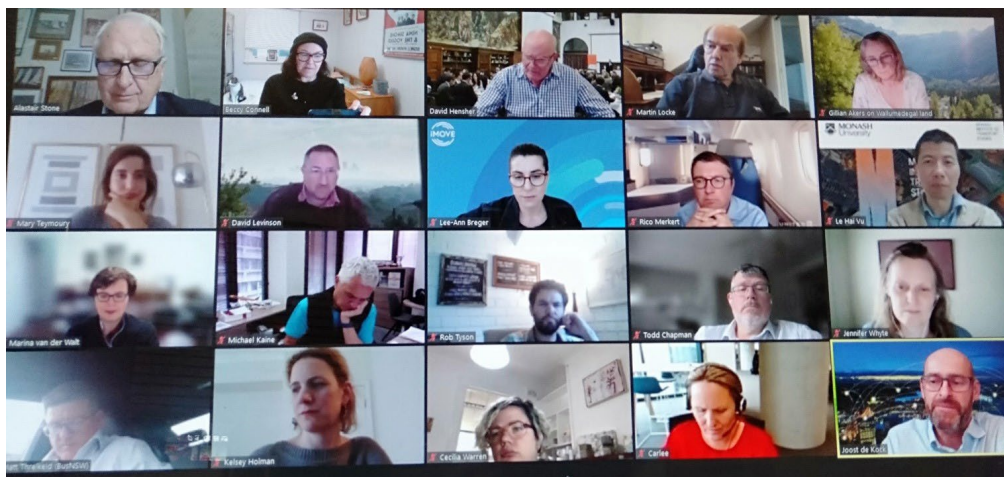
Board of Advice Meeting, November 2021

Teaching and Learning

Award Programs

Undergraduate

In 2021 the Monash Institute of Transport Studies continued to deliver transport units in the Bachelor of Engineering program on both the Australian (Clayton) and Malaysian (Kuala Lumpur) campuses. Over 600 students completed the two core units (CIV2282 Transport and Traffic Engineering and CIV3282 Road Engineering) in 2021 and over 130 completed a final year elective (CIV4284 Traffic Systems). Those units are part of undergraduate civil engineering degrees co-accredited under both the Australian and Malaysian Engineering Education Accreditation Systems. Note that the final year elective CIV4283 Transport Planning was paused in 2021due to the staff shortage.

Postgraduate Coursework

The ITS-Monash Master of Transport and Traffic degree, offered on-line, is structured around five core units and electives. A number of those units are also offered as part of a transport specialisation in the Master of Advanced Engineering, a rapidly growing on-campus program, taught on the Clayton campus. Over 100 students were involved in the Masters degrees offered on the Clayton campus. As part of an adjustment in the postgraduate programs offered by the Faculty, the Master of Transport and Traffic was closed to further enrolments with the immediate priority to be the campus based masters degrees. As part of that change a new postgraduate unit was offered for the first time in Road Engineering. Monash ITS also offers a Master of Transportation Systems degree in conjunction with South-East University in China. The program reached its enrolment cap of 80 students in 2021.

In 2021, ITLS-Sydney continued to offer a suite of postgraduate courses in Logistics and Supply Chain Management, Transport and Infrastructure. Our revised Master of Logistics and Supply Chain Management launched this year with a suite of new units including more emphasis on resilient and sustainable supply chains. A revised Master of Commerce was also launched. In this, ITLS-Sydney offers a specialisation in Global Logistics, which has a strong managerial focus. ITLS also offers the Master of Transport in conjunction with the Faculty of Engineering and the Faculty of Architecture, Design and Planning. Our programs are designed to allow students to tailor their learning experience, with the ability to enter at Graduate Certificate, Graduate Diploma or Masters level. Students can also choose from a range of online and part time friendly units. ITLS academics also teach an undergraduate unit on Managing Food and Beverage Supply Chains and also teach into the highly ranked Master of Management and Master of Business Administration (MBA) programs.

Postgraduate Research

The Key Centre has the largest higher degrees by research program in the transport and/or logistics field in Australia. Monash ITS had 25 continuing student enrolments. At ITLS, there were three PhD graduations with 24 continuing students.

Enrolments

Degree	Enrolments
Institute of Transport Studies, Monash University	
Doctor/Master of Philosophy	25
Master of Advanced Engineering (Transport)	35
Master of Transport and Traffic	53
Master of Transport	2
Master of Transport Systems	80
Institute of Transport and Logistics Studies, University of Sydney	
Doctor/Master of Philosophy	24
Master of Commerce Global Logistics specialisation	284
Master of Logistics and Supply Chain Management	168
Master of Transport	18
Graduate Certificate in Transport	1
Graduate Diploma in Transport	1
Graduate Diploma in Logistics and Supply Chain Management	21
Graduate Certificate in Logistics and Supply Chain Management	7

Unit of study	Enrolments
Institute of Transport Studies, Monash University	
Undergraduate:	
Traffic and Transport Engineering (CIV2282) (Clayton and Malaysia Campuses)	316
Road Engineering (CIV4287) (Clayton and Malaysia Campuses)	326
Traffic Systems (CIV4284) (Clayton and Malaysia Campuses)	175
Postgraduate:	
Advanced Traffic Engineering (CIV5301)	23
Traffic Engineering and Management (CIV5302)	25
Intelligent Transport Systems (CIV5304)	34
Travel Demand Modelling (CIV5305, SEU)	80
Transport and Traffic Data (CIV5309)	24
Planning Urban Transport Systems (CIV5314)	27
Transport Economics (CIV5315)	16
Fundamentals of Urban Public Transport (CIV5316)	80
Road Engineering (CIV5177)	15
Intelligent Tsp Systems: Eng. and Management (CIV5318)	80
Quantitative Methods (CIV5319)	80
Case Studies in Transportation Systems (CIV5320)	80
Modelling Transportation Systems (CIV5406)	80
Sustainable Tsp Systems Planning (CIV5321)	80
Urban Public Transportation Systems (CIV5322)	80

Institute of Transport and Logistics Studies, University of Sydney	
Undergraduate:	
Managing Food & Beverage Supply Chains (ITLS2000)	25
Postgraduate:	
Production and Operations Management (ITLS5020)	82
Introductory Supply Chain Analysis (ITLS5050)	89
Transport & Infrastructure Foundations (ITLS5100)	69
Foundation in Global Logistics (ITLS5250)	134
Supply Chain Planning and Design (ITLS6002)	90

Professional Development

Bus Safety Management Program (BSMP) for Bus Operators

The BSMP provides bus operators with the appropriate skills to offer public bus services which meet regulatory and compliance requirements in Victoria. The program was introduced in 2011, established by Monash ITS in consultation with Transport Safety Victoria (TSV). The program comprises two subjects: Introduction to Bus Safety and Safety Risk Management for Bus Operators.

To maintain the integrity and relevance of the program, Monash ITS staff work closely with Transport Safety Victoria and the Bus Association of Victoria (BusVic). Developing and maintaining a proactive safety culture is now a key focus. The integrity requirements of the program have been strengthened, to ensure that it is the enrolled program participant who is completing assessment tasks, without undue influence or assistance. The flexible, online format has been well received by TSV, the bus industry and course participants. Commencing in late 2020 new software was introduced for program content, to simplify access for program participants.

Enrolments reduced by 25% in 2020, attracting about 100 participants, as a result of the COVID-19 pandemic, as small inbound tourism operators had until 2020 made up a significant part of the market. In 2021 existing bus businesses continued to enrol staff in the program, as part of the professional development programs, with participation lower than in 2020. In 2022 a slow recovery is anticipated due to the reopening of borders and a gradual return of inbound tourism. However, changes to bus safety legislation which will take effect in March 2022 have the effect of reducing the regulatory requirement for intending new operators to demonstrate bus safety competence. The extent of the impact on BSMP enrolments is not yet known.

Bus Business Management Program (BBMO) for Bus Operators

This program was launched by Monash ITS in 2012, providing potential bus service contractors with business management skills appropriate to the industry. It is an essential requirement for all government bus service bids by Victorian bus companies. The course incorporates the two subjects from the Bus Safety Management Program for Bus Operators (mentioned above), along with two additional subjects: Financial Management for Bus Operators and Business Development for Bus Operators. The format of the two additional subjects is undergoing a review while 2 students were enrolled in 2020. This program caters for very low numbers.

Bus and Coach Accreditation Scheme Online Training Course

Transport for NSW is responsible for the regulation of public passenger bus services in NSW (including long distance, tourist and charter services). Under the Passenger Transport Act 2014, all operators of public passenger bus services must be accredited to be able to provide services legally in NSW. This online course is approved by Transport for NSW as meeting the accreditation requirement of competency to operate bus and coach services; applicants must pass the course examination. The course includes four modules: i) Accreditation; ii) Management Information System; iii) Vehicle Maintenance Management System; and iv) Safety Management Systems. The training is delivered through online learning materials including notes, case studies, online quizzes and a discussion board. The Bus and Coach Operator Accreditation Scheme (BOAS) Online Training Course attracted 124 completed enrolments in 2021 despite COVID, with 356 enrolled students in the process of completing their training. At the moment we can only run computer-based exams on our campus. However, under these current circumstances (COVID-19), we are able to allow students to sit a paper-based version of the final examination without travelling to Sydney under the supervision of a suitable person who must have a connection to Australia (i.e. is registered to practise). This has allowed 49 students in regional NSW to successfully complete this course and will ensure that they have accomplished a level of understanding of the obligations of an accredited operator with privileges to provide bus and coach services in NSW.

Discrete Choice Analysis: Models, Estimation and Applications

Almost without exception, everything human beings undertake involves a choice. There continues to be a growing interest in the development and application of quantitative statistical methods to study choices made by individuals or groups with the purpose of gaining a better understanding both of how choices are made and of forecasting future choice responses. Courses in discrete choice modelling and choice experiment design

have been offered by ITLS-Sydney since 2006 and are presented by world experts in the field: Professors David Hensher, Professor John Rose, Professor Bill Greene (who could not participate in 2021) Professor Michiel Bliemer and Dr Andrew Collins. In 2021 we were able to successfully translate this normally face to face course into an online format and attracted one of the largest number of participants we have ever had. Of the 52 interested participants for this course we offered 46 placements to allow the online sessions to be run effectively.

Certificate of Railway Planning and Operations

The Certificate of Railway Planning and Operations which introduces students to the key elements of railway planning and operations was launched in 2018. In 2021 we offered a four day course prepared by Dr Nigel Harris, one of Britain's leading railway planners and it was successfully delivered online by Dr Nigel Harris and Professor John Nelson (Chair in Public Transport). Topics covered include management and business planning, understanding the railway market/environment, passenger behaviour, infrastructure design and timetabling. The course attracted 20 enrolments including participants from Transport for NSW.

Certificate of Transport Management

Though this course was not held in 2021 due to COVID-19 restrictions It attracted 58 participants who have been deferred to our 2022 dates.

Travel Demand Management

ITLS and Transport for NSW collaborated on the delivery of a new short course on Travel Demand Management (TDM) directed by ITLS Chair in Public Transport Professor John Nelson, which was held online over two days (27th / 28th September). Drawing on a wealth of expertise within ITLS the course showcased the latest developments in TDM and we finished the two day journey with a panel discussion on innovative futures for TDM facilitated by ITLS Director Professor David Hensher. Talks were given by John, David, Chinh Ho and Geoffrey Clifton. Plans are underway to hold the course again in 2022.

Student Awards

The Key Centre recognises the achievements of its students and alumni through industry and government sponsored prizes that are presented at annual award ceremonies where our students and alumni joined our Board members, industry partners, and the sponsors of prizes to celebrate the success of our students.

ITS-Monash's awards were presented as part of a virtual Department of Civil Engineering Awards Ceremony with prizes were awarded to the following students:

- Nikou Ahmadi received the ITEANZ-Trafficworks University level award for his final year project performance.
- Stefan Simic and Marcus Wong: winning of Traffic Engineering Student Level 2 and Level 3 Award, respectively, from Traffix Group

ITLS-Sydney's 2021 Awards Presentation Evening was held in conjunction with the 30th Anniversary celebration and the following prizes were awarded to:

- Alan Ma - GS1 Australia Prize for the highest academic achievement in the Contemporary Procurement unit of study (ITLS6003)
- Monica Basuki - GS1 Australia Prize for the highest academic achievement in the Production and Operations unit of study (ITLS6008)
- Ze Wang - Mrs Ma Ching Prize to an international student for the highest academic achievement in a transport, infrastructure and/or logistics and supply chain management specialisation in the Master of Commerce
- Qiaoyan Yu - Supply Chain & Logistics Association of Australia Award for Excellence for the highest academic achievement in the Master of Logistics and Supply Chain Management
- Van (Ken) Ho – Wendy and Christopher Adam Prize for the highest academic achievement in the Master of Transport program.
- Andrew James Iemma – Peter Koning Memorial Award for the domestic student with the highest academic achievement in a transport, infrastructure and/or logistics and supply chain management specialisation in the Master of Commerce.
- Henry Cheung – ITLS Studies Prize for excellence in postgraduate research in transport, logistics or supply chain management.
- Gareth Jude and Hamid Ensafian – The Wendy and Christopher Adam Prize (HDR Students)

ITLS 30th Anniversary Celebration

After a twelve-month postponement and under the shroud of some lingering social restrictions (no dancing or singing!), ITLS was finally able to celebrate our 30th year of existence, in our 31st year. Although impacted by COVID in that attendance numbers were restricted and our overseas guests were unable to attend in person, 130 of our friends and colleagues came together on a chilly May evening under the imposing eye of Vergil Lo Schiavo's *Mankind* mural in the stately confines of the University's Holme Building Refectory to mark the gala event. Over three hours, we were able to reflect on our many achievements, commend our outstanding academics and students and acknowledge the exceptional leadership of Founding Director, Professor David Hensher.

Short addresses were made by Professor Stephen Garton, Vice-Chancellor, University of Sydney, Mr Rob Sharp, Secretary at Transport for NSW, Professor John Shields, Academic Director, International, The University of Sydney Business School, ITLS Alumni, Helen Battellino, Professor Michiel Bliemer, Chair in Transport and Logistics Network Modelling, ITLS while Deputy Director Professor Rico Merkert introduced a video salutation from Professor Emerita Corinne Mulley in the UK. This was followed by a sumptuous meal allowing plenty of time for catching up with old friends and networking with new ones.

Videos and photographs from the evening can be viewed **here**.

Image 1: Dr Joost de Kock (Deputy Secretary Customer Strategy and Technology, TfNSW), Professor Stephen Garton, Rob Sharp (Secretary, TfNSW), Professor David Hensher
Image 2: Professor Rico Merkert
Image 3: Professor John Shields
Image 4: Professor Stephen Garton   *All images by Murray Harris*

Research and Consultancy

FUNDING AWARDED IN 2021

Australian Research Council Discovery Project Grants

Australian Research Council Discovery Project Grant
Context-aware verification and validation framework for autonomous driving
(2021-23, AU$449, 000)
Professor TY Chen, **Professor Hai Vu,** Dr Hoai Liu, Dr. Xi Zheng and A/Prof. Zhiquan Zhou
This project aims to enhance the reliability and safety of emerging self-driving vehicles, through a framework that supports the validation and verification of autonomous driving systems. This project expects to generate new knowledge in areas of software engineering, intelligent transport, and machine learning, using multi-disciplinary research combining expertise from various fields. Expected outcomes of this project are a family of new context aware techniques to verify and validate complex behaviours in autonomous driving. This should provide significant benefits, such as safe autonomous driving systems and the improved journey experience and security for road users.

Co-operative Research Centre (CRC) Grants

***i*MOVE Co-operative Research Centre (CRC)**
Working from Home (WFH) and Implications for Revision of Metropolitan Strategic Transport Models (2021, AU$280,000)
Professor David Hensher, Professor John Nelson, Associate Professor Matthew Beck, Dr Camila Balbontin, Andre Pinto
This project was extended and additional funding provided in 2021. The project tracks the travel activity and positions in relation to WFH of the Australian population through a longitudinal data plan (commencing in March 2020) and what this might mean as we get to understand responses from employers and employees to WFH until we reach some equilibrium, possibly when vaccination is widespread. This raises important questions as to what revisions will be required to strategic models used by State governments in respect of modal choice and frequency of weekly travel under various WFH futures. The research program develops revised post-Covid-19 travel choice models conditioned on WFH preferences.

***i*MOVE Co-operative Research Centre (CRC)**
Promoting Sustainable University Travel Choices (PSUTS) (2021, AU$200,000)
Professor John Nelson, Professor David A Hensher, Professor Matthew Beck, Dr Camila Balbontin
Journey to work patterns have been substantially reset as the result of COVID-19. The existing iMOVE project ("Working from Home (WFH) and implications for revision of metropolitan strategic transport models") led by ITLS in partnership with TMR, TfNSW and WADoT has shown that the influence of WFH is likely to be profound. Studying from home (SFH) has also become prevalent since March 2020, and while this has subsided in Australia for primary and secondary education, it largely remains in place for tertiary education, and in many instances international students are now studying from their home country. The physical absence of tertiary students has had a significantly large impact on public transport (as well as on local suppliers of student accommodation, and other support industries and services). With the easing of restrictions, many students are showing a keen interest in hybrid modes of teaching and learning. TfNSW are interested in learning more about the emerging and intended commuting patterns of university staff and students post-pandemic and the implementation of return to campus plans of universities to further inform the development of their Travel Choices program. To realise this goal, this project will conduct a rapid review of the staff and student travel plan literature, the review of selected return to campus plans and sustainable travel plans and existing TfNSW Travel Plan Toolkit materials; conduct surveys of staff and students travel behaviour in the light of modified study and work modes across selected USYD campuses; and develop a University Travel Choices implementation plan for the USYD campus(es). This will enable us to provide robust recommendations for suggested initiatives to influence travel behaviours and demand in a university environment.

***i*MOVE Co-operative Research Centre (CRC)**
Design of a Regional Town and Rural Hinterland (RTRH) MaaS Blueprint (2021, AU$300,000)
Professor John Nelson, Professor David Hensher, Dr Chinh Ho, Dr Camila Balbontin, Professor Emerita Corinne Mulley

Mobility as a Service (MaaS) is a centrepiece of the Future Transport Technology Roadmap of Transport for NSW (released in April 2021). Although we are accumulating a great deal of knowledge and experience in progressively introducing elements of MaaS into a metropolitan setting, there is a void in the context of Regional Towns and Rural Hinterlands (RTRH), with the generally accepted position that the metropolitan context is quite different to RTRH. MaaS in RTRH is unlikely to be built on a strong regular route-based public transport offer, and therefore car-based solutions are likely to be important in the mix with potentially more flexible forms of public transport services and possibly a different client customer base. In a RTRH setting, reducing social exclusion and improving well-being will come to the forefront as very important objectives that can be enhanced through a MaaS framework. The objective of this Project is to design a blueprint for future MaaS initiatives in a RTRH setting, drawing on experience in the Sydney MaaS trial, international evidence, and new data specifically collected with all stakeholders in the RTRH environment.

*i*MOVE Co-operative Research Centre (CRC)
Outcomes and community benefits of a regional active travel network: Evaluation of the Wagga Wagga Active Travel Plan (2021)
Professor Stephen Greaves (consultative role)
This research will analyse the impacts and outcomes of the Wagga Wagga Active Travel Plan on transport integration, travel mode switching, user preferences and behaviours, city connectedness, traffic and parking congestion, health and social wellbeing, and other community benefits.

*i*MOVE Co-operative Research Centre (CRC) with Thales
An empirical analysis of drone ecosystems in 4PL logistics involving warehouse and last-mile delivery operations
(2021-2024, AU$102,000)
Syed Mujtaba Hussin

*i*MOVE Co-operative Research Centre (CRC)
How can we build trust and collaboration about MaaS stakeholders?
(2021-2023, AU$13,333)
Thiran Kandanaaracchi

*i*MOVE Co-operative Research Centre (CRC) with Air New Zealand
Adopting blockchain technology for enhancing airline sustainability and supply chain/customer confidence
(2021-2023, AU$27,500)
David Li

*i*MOVE Co-operative Research Centre (CRC)
Hybrid drone-truck last-mile delivery planning for e-grocery business
(2021-2022, AU$7,500)
Hamidreza Ensafian

*i*MOVE Co-operative Research Centre (CRC)
The implementation of sustainable transport policies
(2021-2023, AU$13,333)
Miguel Loyola

*i*MOVE Co-operative Research Centre (CRC)
Integrated last-mile network design for parcel delivery in the age of e-commerce and digitalization
(2021-2022, AU$11,667)
Roberto Gomes de Mattos

Other External Research Funding

An investigation of regional public transport spend in Australia (2021, AU$9,504)
Bus and Coach Association of South Australia (BusSA), Australia
Professor John Nelson, Thiranjaya Kandanaarachchi

Aviation Market Development in the New Normal post COVID-19 Pandemic - An analysis of air connectivity and travel behaviour (2021, US$9,000)
Economic Research Institute for ASEAN and East Asia (ERIA)
Professor David Hensher, Professor Xiaowen Fu
This proposed study aims to quantify the impacts brought by the COVID-19 pandemic on air connectivity and passenger travel behaviour, so that the right policy and managerial strategy can be designed to help the aviation industry reach a sustainable "new normal".

Comparative Assessment of Emissions associated with the Bus Fleets of Victorian Bus Operation under diesel hybrid and electric futures (2021, AU$109,000)
Bus Association Victoria, Australia
Professor David Hensher, Dr Camila Balbontin, Dr Edward Wei

Food Safety in Southeast Asia: A One Health Approach (2021, AU$24,850)
SSEAC Seed Funding
Dr Chinh Ho

Significant Continued Research Funding

Australian Research Council Discovery Project Grant
Efficient and fair context-aware resource allocation in networks
(2019-21, AU$440, 000)
Professor Hai Vu, Dr Lachlan Andrew and Dr Tran Khoa Phan
This project aims to develop a flexible mathematical framework for internet resource allocation among competing demands by exploiting application context to allocate resources more efficiently. The project will extend an existing framework which allocates resources independently at each time period, by considering benefits over periods of time relevant to users. The expected outcome of this project is a systematic method for designing next-generation congestion-avoidance protocols that anticipate and accommodate different types of demand. This project will provide significant benefits including better provision of internet services and new ways to help combat traffic congestion, bringing benefits to both the environment and society.

The long-term effects of autonomous cars on land use, access and travel
(ARC DP200100952, 2020-23, AU$$199,962)
Professor Graham Currie and Dr Md. Kamruzzaman
Autonomous vehicles are a major world trend which will significantly impact Australian communities. Current research is focused on autonomous vehicle technology and short-term benefits (reduced crashes, congestion relief). This project explores long-term disruptive effects with a focus on land use and travel impacts to ensure wider social, economic and environmental impacts are better managed. Findings from this project will help Australian cities prepare for the long-term disruptions of autonomous vehicles.

Australian Research Council Discovery Early Career Award
Understanding the preventing road deaths using coronial recommendations
(2017-2022, AU$327,900)
Dr Marilyn Johnson
Fatal road crashes are sudden, unexpected and violent. Each fatality has a lasting impact resulting in immeasurable emotional costs and a financial burden in excess of $3.8 billion per year. This study is a systematic analysis of coronial death investigations of fatal road crashes in Australia using public health and road safety theoretical frameworks. Intended outcomes will contribute to our understanding of fatal road crashes including new insights into pre-crash social factors (e.g. alcohol/drug use and dependence, unemployment, age), the utility and impact of coronial recommendations on road safety policy and practice and preventing deaths on Australian roads.

iMOVE Co-operative Research Centre (CRC)
(2017-2026)
The Federal Government has granted a group of nearly fifty leading industry and research organisations known as the iMOVE Co-operative Research Centre (CRC), a total of $55 million over ten years to explore intelligent transport systems including self-drive vehicles. Key members of the iMOVE CRC include Institute of Transport and Logistics Studies (ITLS) and the University of Sydney's Faculty of Engineering and IT. In 2021, ITLS was involved in a number of existing projects in addition to the new projects mentioned above.

Who Benefits from the Sharing Economy? Disruption in Australian Cities
(2020-2024, AU$115,000)
Professor Rico Merkert (with University of Queensland)
Technological disruption has created new possibilities for employment and social interaction in cities yet comes with many associated challenges for policymakers. This project aims to formulate a critical understanding of the sharing economy as a disruptive social, economic, and political process in Australian cities. The project team will apply advanced spatial analytics and theoretical approaches to three distinct facets of the sharing economy, providing new empirical evidence to explain transformative change in cities. It applies a geographical lens to create to new knowledge regarding who benefits from the sharing economy, and how progressive regulation can enhance the outcomes of disruptive technologies.

Australian Transport Research Cloud (ATRC), Australian Research Data Commons (ARDC)
(2020-2022, AU$297,000)
Professor Michiel Bliemer
Funding to create the Australian Transport Research Cloud platform. The platform enables researchers to analyse and model the impact of potential policy changes and planning decisions on transport and travel behaviour, allowing more informed decision making. It provides integrated access to a range of high quality datasets (ABS Census and Journey to Work datasets, State Household Travel Surveys, National Road network datasets, real time traffic and public transport data, people flow data, public transport timetable data, and de-identified smart travel card datasets) and transport network analysis and simulation tools.

Freight estimation and forecasting on the Melbourne-Brisbane Inland Rail Corridor
(2020-2021, AU$146,200)
Prof Rico Merkert, Prof David Hensher and James Bushell
Client Commissioned Research, BIS Oxford Economics, Department of Infrastructure, Transport, Cities and Regional Development

University Research Grants

An investigation of modern slavery risk mitigation in supply chains: A natural language processing approach (2021, AU$12,826)
Business School - Pilot Research Grant
Dr. Jyoti Bhattacharjya
Modern slavery practices in multinational supply chains include various forms of forced labour and labour associated with human trafficking. Every year, these exploitative practices impact the lives of millions of vulnerable children and adults. Recent legislations in many countries including Australia are requiring companies to increase transparency within their supply chains. This study will use natural language processing methods to examine the modern slavery risk mitigation and public reporting approaches of organizations and generate recommendations for both organizations and legislators.

Towards truly multimodal subnetwork analysis (2021-2022, AU$7,000)
Future Transport Research Group Collaboration Scheme
Dr Mark Raadsen, Emily Moylan, Mohsen Ramezani, Jennifer Kent, Somwrita Sarkar
Transport research is increasingly focussed on multimodality, highlighted, for example, by the TfNSW priority program on MaaS (TfNSW Future Transport Technology Road Map). In some areas, multimodality is already reasonably well captured (household travel surveys). In others it remains an area where gains are to be made. Research on pedestrian safety and accessibility for example are usually at a scale that ignores broader network effects, while strategic planning models often ignore all but private vehicle modes. Yet, in practice their often opposing objectives are combined with ill effects when designing policies. At the intersection of these modelling scales, there is a need for a true multi-modal research perspective. Our objective is to create, and make freely available, a multimodal, multi-intersection subnetwork annotated

dataset, including both network structure and dynamics of flow information, that can be used to conduct multi-disciplinary research that has the richness to support an integrated perspective across modes. Further, we hope to not have to rely on continuous video footage, but instead will be able to track travellers through the network even with spatial gaps present using novel AI matching methods.

Virtual commuting: Dawn of a new age? (2021-2022, AU$3,000)
Future Transport Research Group Collaboration Scheme
Prof Stephen Greaves, Prof Matthew Beck, Melanie Crane, Karine Manera, Chris Standen
The aims of the proposed research are to investigate the extent to which employees have embraced 'virtual commuting' during the extended lock-down and enforced working from home. For a small (and crucially low-risk) investment this will provide unique insights into how work practices, active travel, health and well-being have shifted during the pandemic and the implications for future flexible working arrangements, which seem likely to involve more working from home/less commuting long term6. This will support submission of a Category 1 grant involving this interdisciplinary research team of early, mid and senior career researchers.

Engagement

Public Lectures and Seminars

Leadership and Policy Seminar Series and Research Seminar Series

Established in 2003, the ITLS-Sydney Leadership and Policy Seminar Series benefits from leading national and international experts (CEOs, Visiting Professors etc.) speaking on topical transport and logistics issues relevant to business and academia. The seminar series attracts a broad audience from industry, government and academia as well as our own faculty and research students. The seminar conveners are Professors Rico Merkert and John Nelson.

Established in 2018, the ITLS-Sydney Research Seminar Series brings leading national and international research experts to share their current and most exciting research projects. The seminar series attracts a broad audience from industry, government and academia as well as faculty and research students. The seminar convener is Professor Michael Bell.

In 2021, the following presentations were given both in person and virtually.

The Juggle Is Real – Leading Tourism, Transport & Aviation Through a Crisis
21 April 2021
Margy Osmond, CEO, Tourism and Transport Forum Australia

The Journey to Emissions Free Urban Buses - Technical, Operational and Contractual Challenges Ahead
29 June 2021
Neil Smith, Managing Director, Transit Systems

Future Transport Technology Roadmap
22 September 2021
Dr Joost de Kock, Deputy Secretary Customer Strategy and Technology, Transport for NSW

Integrated, data-driven urban design and agent-based mobility simulation
15 September 2021
Dr Pieter J. Fourie, Senior Research Consultant at URaP International

Blockchains for Supply Chains
15 November 2021
Max Soyref, Jonathan Kempe, KPMG and Verifai

Zero Emission Buses Forum
1 December 2021
Rod Sharp. Secretary Transport for NSW, Professor David Hensher, ITLS and industry panel

Transport Research Association of NSW (TRANSW) Annual Symposium
30 November, 1 and 2 December 2021
This year, 19 research students from ITLS joined 33 other students from TransportLab, UNSW, UTS, and the University of Wollongong to present their latest ideas and finding on the topics of Mobility-as-a-Service, public and on-demand transport, automated vehicles, future city logistics, sustainable transport, novel transport modelling techniques, vulnerability of rail infrastructure, and innovations in freight transport. Almost 300 delegates from government, industry, and academia attended the various sessions.

ITLS HDR Supply Chain Symposium
6 December 2021
This year's symposium was held online and was attended by members of ITLS and industry. Four speakers presented their work. The symposium provides a forum for presentation for those HDRs whose research does not fall within the remit of the sister TRANSW symposium.

Committees

- **Professor Matthew Beck**
  United States Transportation Research Board Committees: Stated Response (Chair)

- **Prof Behnam Fahimnia**
  IEEE Technology & Engineering Management Society, Board Member; Supply Chain Association of Australia, Director and Board Member

- **Professor Michael Bell**
  International Symposium on Transport Network Reliability Scientific Committee (Chair, International Advisory Committee); United States Transportation Research Board Committee: Intermodal Freight; Member of International Advisory Committee, Hong Kong Society for Transport Studies (HKSTS)

- **Professor Michiel Bliemer**
  International Scientific Committee of the Dynamic Traffic Assignment Conference, Chair of the Transport Research Association for NSW, Member of the organising committee of the TRANSW Symposium 2020, Director Future Transport Research Group, Director Travel Choice Simulation Laboratory

- **Professor Graham Currie**
  United States Transportation Research Board Committee: Light Rail Transit Systems (Chair); Land Transport Authority of Singapore, Research Advisory Board Member; K2 Swedish National Centre for Research and Education on Public Transport - International Advisory Board Member, Conference Organising Committee - National Streetcar and Light Rail Conference, New Jersey USA; Track Chair - Public Transport - Australasian Transport Research Forum, Committee for Melbourne - Transport Task Force, Associate Editor - Transportation

- **Dr Alexa Delbosc**
  Transportation Reviews (editorial panel member)

- **Prof Behnam Fahimnia**
  IEEE Technology & Engineering Management Society, Board Member

  Professor Stephen Greaves
  Travel Survey Conference International Steering Committee; Australasian Transport Research Forum Executive Committee

- **Professor David Hensher**
  Advisory Board, Institute of Transport and Logistics Studies (Africa), South Africa; International Conference Series on Competition and Ownership in Land Passenger Transport, International Steering Committee (Chair), Partner, Volvo, Educational and Research Foundation Centre of Excellence in Bus Rapid Transit, Chile

- **Dr Chinh Ho**
  Permanent Scientific and Technical Committee, Cooperation for Urban Mobility in the Developing World

- **Dr Marilyn Johnson**
  Amy Gillett Foundation Research and Policy Committee, Australasian College of Road Safety (Victorian Chapter), Australasian Road Safety Conference (Organising Committee, Scientific Committee (Chair)), CLOCS-A National Working Group, Road Safety Education Scientific Advisory Committee

- **Adjunct Professor Martin Locke**
  Board member, Infrastructure Partnerships Australia, Australia

- **Professor Rico Merkert**
  United States Transportation Research Board Committees: Air Cargo, Aviation Economics, Editor-in-Chief Journal of Air Transport Management.

- **Professor Corinne Mulley**
Partner, Volvo, Educational and Research Foundation Centre of Excellence in Bus Rapid Transit, Chile; Executive Board, World Symposium of Transport and Land Use Research (former Chair); Transportation Reviews (editorial panel member);Research in Transportation Business and Management (editorial panel member); Emerald Transport and Sustainability Series (editorial advisory board), Journal of Transportation (Editorial Board)

- **Professor John Nelson**
ITS Australia, MaaS National Reference Committee, Chair, Mobility Working Group, Business Council for Sustainable Development Australia, Member, American Society of Civil Engineers (ASCE) Mobility Innovation Committee (USA), Member and sub-group leader, International Transport Forum (ITF) Working Group on Innovative Mobility for the Periphery (OECD, Paris).

- **A/Professor Dong Ngoduy**
Transportmetrica A, Associate Editor; Transportmetrica B, Associate Editor; IET Intelligent Transport Systems, Associate Editor; ARC detailed assessor; Member of the UK Research Council (EPSRC) Peer Review College; TRISTAN: Member of the International Scientific committee.

- **Professor Geoff Rose**
Australasian Transport Research Forum: National Executive Committee; United States Transportation Research Board Joint Sub-committee: Emerging Vehicles and Low Speed Transportation

- **Adjunct Professor John Kenneth Stanley**
Member, Advisory Committee, Institute of Transport Studies, Monash University, Australia, 1995 - present.

- **Dr Susi Susilawati**
United States Transportation Research Board Committees: Geographic Information Science and Applications (Friend); United States Transportation Research Board Committees: Urban Transportation Data and Information Systems (Friend); Indonesia: International Symposium on Transportation Studies for Developing Countries

- **Professor Hai L. Vu**
IEEE Transactions on Intelligent Transport Systems, Associate Editor; United States Transportation Research Board Committees: Artificial Intelligence and Advanced Computing Applications: ABJ70 (Member)

- **Dr Nan Zheng**
Editorial board member: Transportmetrica B: Transport Dynamics, PLOS One, Transportation Research Part C

Awards

- **Professor Matthew Beck**
  - Excellence in Research Engagement Award, Business School, 2021
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)
  - Excellence in Research for mid-career researchers, Business School, 2021
  Recognition of outstanding performance in research by a researcher who is within 6 and 10 years of PhD conferral.

- **Professor Michael Bell**
  - Excellence in Research Engagement Award, Business School, 2021
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)
  - Research Supervision Award, Business School, 2021
  This award recognises outstanding research supervision and leadership in higher degree research in the Business School.
  - Beta Gamma Sigma (BGS) Professor of the Year Award, 2021

- **Dr. Saman Eskandarzadeh**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)

- **Professor Behnam Fahimnia**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)
  - Australia's Research Field Leader, Top 50 Researchers of Australia in Operations Research 2021.

- **Professor David Hensher**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)
  - Australia's Research Field Leader, Top 50 Researchers of Australia in Transport 2021.

- **Dr Chinh Ho**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)

- **Professor Rico Merkert**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)

- **Professor John Nelson**
  - Excellence in Research Engagement Award, Business School, 2021.
  For outstanding research in contributions in partnership with industry, community or government (iMOVE)

Industry Sponsored PhD Scholarships – Monash

Transport for Victoria
Laura Aston
Exploring the Transit Orientation of Urban Development and its Impact on Public Transport in Melbourne

Transport for Victoria
Homayoun Rafati
Big data and visualisation

Transport for Victoria
Rejitha Ravindra
Network synchronisation

Transport for Victoria
Taru Jain
Shared mobility

Transport for Victoria
Laura McCarthy
Changing travel behaviour

Transport for Victoria
Victoria Radnell
Tourism and public transport

Transport for Victoria
Maryam Nawaz
Reliability engineering approaches

Transport for Victoria
Rachel Mence
Gender diversity

BusVic
Prudence Blake
The new bus rider

BusVic
Jianrong Qiu
Bus safety inspections

Yarra Trams
Matthew Diemer
Placemaking & Streetscape Design: Measuring Perceived Place Quality and Understanding its Implications for Tram Modernisation

Yarra Trams
Luke Valezna
Passenger falls in trams

Transdev Melbourne
Nora Estgfäller
Exploring Route Density/Frequency and First/Last Mile Solution Trade Offs in Transit Network Design

Transdev Melbourne
Sarah Roberts
Future bus

Metro Trains Melbourne
Lisa Fu
Future Train: Design investigation into passenger rail carriage interiors for Melbourne

Metro Trains Melbourne
Amy Killen
Designing Urban Rail to Reduce Vandalism

VicRoads
James Reynolds
Bus and tram priority

VicRoads
Samithree Rajapaksha
Simulating bus and tram priority

IP-GRIP Program (BusVic)
Ha Anh Nguyen
Exploring the Safety Impacts of Bus Asset Ownership Models

Industry Sponsored PhD Scholarships – University of Sydney

Metro Trains
James Bushell
How to better coordinate operators in the passenger transport industry to provide better mobility as a service

Qantas
Alicja Gajewska
Determinants of successful performance measurement and management with the use of strategic management approaches: Visualized performance benchmarking in the airline context

Thales
Syed Mujtaba Hussin
An empirical analysis of drone ecosystems in 4PL logistics involving warehouse and last-mile delivery operations

Forest Coach Lines
Thiranjaya Kandanarachchi
Improving trust and collaboration among stakeholders in the Mobility as a Service eco-system

Air New Zealand
David Li
Adopting blockchain technology for enhancing airline sustainability and supply chain/customer confidence

Lion
Maryam Teymoury
Behavioural decision-making and contractual structures

Media

The following word cloud represents the main themes and topics from media coverage featuring ITLS and Monash researchers in 2021. Eleven ITLS Sydney and two Monash ITS researchers featured in 87 separate media appearances including national and international newspapers, television, radio and websites. It should be noted that five ITLS Sydney researchers, Professors Michael Bell, David Hensher and Rico Merkert, Associate Professor Matt Beck and Dr Geoffrey Clifton were listed in the Top 10 spokespeople from the Business School by audience across 2021. This is an important achievement as increasing our media presence and in turn, our research impact, is a key component of the ITLS five-year strategic plan.

Centre Outputs

<table>
<tr><td colspan="2" align="center">

Australian Government

Australian Research Council

ARC Centres of Excellence

Centre Outputs and Detailed Income and Expenditure Report

(CODIE)

</td></tr>
<tr><td>Centre Name:</td><td>ARC Centre of Excellence of Teaching and
Research in Transport Management</td></tr>
<tr><td>Centre ID: (eg CE1100006)</td><td>NO95/08214</td></tr>
<tr><td>Calendar Year Reported:</td><td>2021</td></tr>
<tr><td>Centre Admin. Organisation:</td><td>The University of Sydney</td></tr>
</table>

CENTRE OUTPUTS AND DETAILED INCOME AND EXPENDITURE REPORT (CODIE) GUIDE

CODIE data from individual Centres is for use within the ARC and will not be published. Consolidated figures may be published, used for evaluation purposes or to promote the overall achievements and/or outcomes of the ARC Centres.

The ARC is interested in tracking the development of the Centre as a focal point for research and as an attractive destination for high-quality researchers. The Outputs categories align Centre outputs with the outputs of other ARC schemes.

Reporting requirements

- Centres **receiving** ARC centre funding must submit a completed CODIE (Certification, Outputs, Income, Expenditure, In kind, Personnel and Other ARC grants worksheets) along with five (5) copies of the Annual Report

- Centres **no longer receiving** ARC centre funding, but retaining their title, must submit a completed Outputs worksheet only from this CODIE along with one (1) copy of the Annual Report.

To be noted when completing the CODIE:

- The CODIE is NOT a balance sheet. The total income does not necessarily have to balance the total expenditure.
- Headings should not be modified. New headings must only be entered under the "Other" category.
- Leave blank any rows that are not applicable to your Centre.
- New rows may be added to tables if more entries are required.
- All data must be for the 2020 calendar year ONLY.
- Insert Centre Details on sheet 1 (Title Page) before completing the remainder of the CODIE. These details will auto-fill across the worksheet.
- Example worksheets are provided. Please note the data in these examples are illustrative only and do not represent indicative amounts.

Submitting your CODIE (due by 31 March each year)
To submit your CODIE please:
1. Check the Centre name below is correct.
2. Print this page and sign the Certification below.
3. Print one (1) copy of each worksheet.
4. Post this with the signed Certification page and five (5) paper copies (one for Centres no longer receiving ARC Centre funding) of the Centre's Annual Report to:
    Centres Coordinator
    Australian Research Council
    GPO Box 2702
    Canberra ACT 2601
5. Email an electronic copy of this file to centres@arc.gov.au

Certification
To be signed by an authorised officer of the Centre.
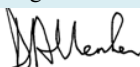I hereby certify that the following sheets are an accurate representation of the outputs, income and expenditure of the:

ARC Centre of Excellence of Teaching and
Research in Transport Management
covering the calendar year 2021 and that I am authorised to approve their submission.

Certified by:

Signature
Print Name
Professor David Hensher
4 March 2022

ARC Centre of Excellence of Teaching and Research in Transport Management

Instructions

- **Include outputs for ALL Centre activities (including those arising from Centre staff not named as Cis or PIs).**
- **Do not include any outputs from other ARC-funded projects or from work predominately completed before commencement of the Centre.**
- **If you are unable to differentiate between Centre outputs from other ARC-funded projects, these may be included in Column A. In these cases, the (double counted) outputs should also be acknowledged in Column D.**
- **Include only 2021 accepted and in-print books/articles. Do not include outputs that were listed in the 2021 CODIE.**

Code	Type of Output	A Number of Centre outputs	B Number of outputs in Column A that included overseas involvement (i)	C Number of outputs in Column A that involved personnel external to the Centre (ii)	D Number of outputs in Column A also attributed as outputs of other ARC Projects (iii)
A1	Book – authored research	0	0	0	0
A2	Book – authored other	0	0	0	0
A3	Book – edited	3	2	2	1
A4i	Book – revision/new edition	0	0	0	0
A4	Book - translation	0	0	0	0
B	Book chapter	20	4	7	1
C1	Journal article – articles in scholarly refereed journal	132	70	91	7
C2	Journal article – other contribution to refereed journal	4	0	0	0
C3	Journal article – non-refereed article	1	1	1	0
C4	Journal articles – letter or note	0	0	0	0
C5	Unpublished reports (including commercial consultancies)	1	0	0	0
D	Major review	0	0	0	0
E1	Conference – full written paper-refereed proceedings	19	5	12	0
E2	Conference – full written paper-non-refereed proceedings	0	0	0	0
E3	Conference – extract of paper	0	0	0	0
E4i	Conference – edited volume of conference proceedings	0	0	0	0
E4	Conference – unpublished presentation	1	0	3	0
F	Audio-visual recording	0	0	0	0
G	Computer software (including digital maps, data, web outputs)	0	0	0	0
H	Designs	0	0	0	0
H2	Technical drawings	0	0	0	0
I	Patents - filed	0	0	0	0
I2	Patents - pending	0	0	0	0
J1i	Other creative works – major written or recorded work	0	0	0	0
J2i	Other creative works – minor written or recorded work	0	0	0	0
J3i	Other creative works – individual exhibition or original art	0	0	0	0
J4i	Other creative works – representation of original art	0	0	0	0
J1	Major creative works	0	0	0	0
J2	Creative work including in group exhibition, performance, recording or anthology	0	0	0	0
J3	Exhibition curatorship	0	0	0	0
K	Number of national collaborating institutions (iv)	15/2	0	0	0
L	Number of international collaborating institutions	25/19	0	0	0
M	Number of countries involved in collaboration	18/10	0	0	0
N	Number of countries from which international visitors originated	0	0	0	0
O	Number of international visitors	0	0	0	0
P	Number of overseas visits by Centre personnel	0	0	0	0
Q	Number of countries visited by Centre personnel	0	0	0	0
R1i	Training programs/teaching packages conducted	4/2	0	0	0
R1	Number of PhD students graduated	3	0	0	0
R2	Number of Masters students graduated	235	100	0	0
R3	Number of Honours students graduated	0	0	0	0
S1	Number of PhD students enrolled	24/25	14	0	0
S2	Number of Master students enrolled	501/170	0	0	0
S3	Number of Honours students enrolled	0	0	0	0
T	Number of early career researchers (within 5 years of PhD completion)		0	0	0

(i)   Outputs with overseas involvement – e.g., #journal articles with international co-authors, # international students enrolled/graduated
(ii) Outputs with involvement from outside the Centre – e.g. # journal articles with co-authors not affiliated with the Centre
(iii) Outputs which have been attributed elsewhere in ARC reporting, - e.g. Linkage Project final reports
(iv) Codes K-Q = Sydney/Monash