THE UNIVERSITY OF MELBOURNE

Networked Society Institute

Annual Report 2017

Networked Society Institute

Annual Report 2017

Further Information

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Licence

Director's Welcome

Welcome to the Networked Society Institute's 2017 Annual Report. We are an interdisciplinary research institute at the University of Melbourne. Our research focuses on understanding and creating the connected future.

This Annual Report provides details of our activities throughout 2017. Since the refocusing of the Institute in 2015, we have firmly established a leading presence in enabling exciting new research that is generating positive social impact.

The Networked Society Institute operates across the University of Melbourne to encourage and enable interdisciplinary research. The Institute is built from the collective endeavours of our research community and collaborators. We are fortunate to have a talented team of academics affiliated with the Institute who shape and create the innovative solutions for the networked society. These include leading academics who provide research leadership through the Executive Committee, leading experts in key priority areas as Institute Fellows and all researchers working on projects.

I was excited to welcome our first cohort of Doctoral Academy members this year. These are PhD students who are exploring interdisciplinary approaches to research. Each of them conducting research relating to the networked society.

We are supported by a leading set of industry leaders who provide their time and insights as members of our Advisory Board. In 2017 we welcomed a new chair, Brian Fitzpatrick from Dialog Information Technology and vice-chair, Tim Fawcett from Cisco. I also wish to sincerely thank Steve Wood who was the foundation chair of our Advisory Board serving in that capacity since 2010.

The Institute's team provides critical support to enable the successes of the Institute contained in this Annual Report. Our dedicated Institute staff support projects in a research-enabling capacity through the NSI Lab and tend to their administrative, operational, strategic and engagement concerns.

We actively showcase our research to the community through a number of diverse events. Prof Luciano Floridi from the Oxford Internet Institute, a world leading philosopher focused on information ethics visited the Institute in October and delivered the keynote at our Annual Symposium.

This digital report provides you an overview of our performance for the year. You will find information about our research projects, our research investment, outcomes and engagement. I invite you to read this report and encourage you to get in contact with us should you wish to find out more, connect or collaborate.

Prof Thas A. Nirmalathas
Institute Director

Contents

Director's Welcome **3**

Contents **4**

The Networked Society Institute In 2017 ..... **5**

- 2017 By The Numbers 5
- Our Mission 6
- Industry Collaboration 6
- Building Interdisciplinary Research Capability 7
- Return On Investment 8

Our People **10**

- Institute Staff 10
- Executive Committee 11
- Advisory Board 12
- Institute Fellows 13
- Phd Students 14

NSI Lab **15**

- Lab Projects 15
- Interns 17

New Research Projects **18**

- Coworking Ecologies And The Future Of Work 18
- Immersive Education In Aboriginal History 19
- Personalised Care For People With Type 2 Diabetes (T2d) 19
- Artificial Intelligence And Bipolar Disorder 20
- Fighting Fake News 20
- Project Mycampus 21
- A Sensor-Enabled Campus 21
- Virtual Reality Limbs 22
- Social Robots For Older People 23
- Smoke Taint In The Digital Vineyard 23
- Smartwear For Workplace Health And Safety 24
- Game Engines In The Australian Video Game Industry 25

Continuing Research Projects **26**

- Completed Research Projects 26
- Continuing Developments 26

Data, Systems and Society Research Network (DSSRN) **28**

Academic Centre for Cybersecurity Excellence **29**

Doctoral Academy **30**

Impact And Engagement **33**

- Supporting Research Impact 33
- Facilitating Engagement 34
- Networked Society Symposium 2017 35
- Events 36

Finance **37**

The Networked Society Institute in 2017

The Networked Society Institute continued delivering upon its mission of enabling high quality, innovative interdisciplinary research. We provide an essential lens to further the understanding and shape the experience of the networked society. In 2017, we grew the networked society research community through establishing new initiatives, hosting a diverse range of events, supporting collaboration between students, academics and funding new research projects. We also increased our presence through an active program of engagement. A snapshot is provided in the numbers below.

2017 by the numbers

1	Hackathon
3	International visiting scholars
5	Podcast episodes
8	New Seed Funded projects
13	Staff Members
14	Fellows
18	NSI Lab interns
19	PhD students
23	Events hosted
30	Research projects
47	Partners engaged
51	Media mentions
64	Publications
98	Researchers
1,229	Twitter followers
1,883	NSI News subscribers
2,168	Event registrations
10,277	Visits to NSI website
$6.2 million	Leveraged research funding

Our mission

The Networked Society Institute enables innovation across the University of Melbourne. Our focus is facilitating new research projects that explore impact and harness the potential of the increasing interconnection of people, places and things.

Innovation does not occur in a silo and we have an active and open approach towards collaborating with industry. Internally, we cultivate and foster new interdisciplinary research capacity across the University of Melbourne.

This is achieved through an active program of engagement both internal and external to the University. The Institute is a meeting place for innovation on the networked society. Details of our engagement activities are available on page 33 of this Annual Report.

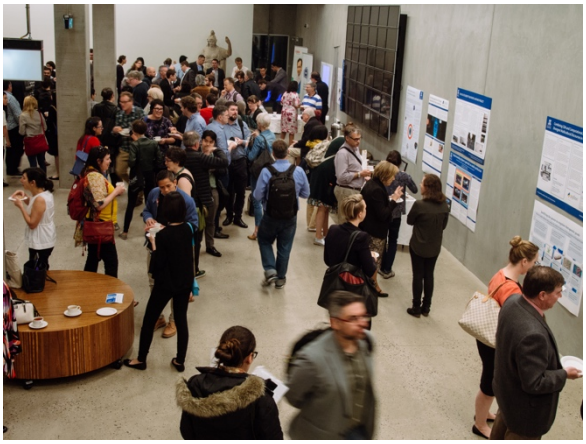


Figure 1: Networked Society Symposium 2017

Industry collaboration

The Institute actively collaborates with industry. We are an entry into the University for collaborative research focused around innovation across the networked society. Our engagement ensures that our research is relevant and remains abreast of the technical innovation and developments.

Collaboration commences with our Advisory Board comprising a selection of leaders from across the technology, research, innovation and application spaces. The Advisory Board ensures that the Institute can exploit collaborative opportunities and plays a role as a broker connecting and facilitating research engagement. Details of the Advisory Board are contained in page 12 of this report.

Our collaborative approach is reflected through a number of our activities. These include hosting of representatives from corporations to share the latest industry insights, exploratory workshops and conducting research projects. In 2017, we hosted representatives from Samsung, Ericsson, Ciena, Nokia and PARC who delivered insightful presentations to our community.

Leveraging Victoria's relationship with Jiangsu, we successfully secured research funding to support the development of an innovative new research partnership with Chushan Technology in China to design and create a smart shirt for workplace health and safety (details page 24).

We hosted two workshops to further our research agenda. One workshop explored the use of 3D printing in medicine, building upon previous work in the 3D printing space. While the second provided a forum for engagement relating to open data.

In 2017 we launched our first hackathon in partnership with Ciena and nbn. AutoHack18 was a unique extended-form hackathon open to all University of Melbourne students running across the summer from December 2017 to February 2018.

Building Interdisciplinary Research Capability

The central role of the Institute is to support and enable new and innovative interdisciplinary research. In 2017 we nurtured, hosted and supported a number of initiatives that facilitate connections, collaborations and creations. These ranged from supporting small scale projects in the NSI Lab through to facilitating the application of a number of grants and applications to funding bodies.

We are shaping an interdisciplinary culture at the University of Melbourne through enabling collaboration across all disciplines. The networked society is impacting future research raising a number of pressing social challenges and creating plentiful opportunities. Harnessing the potential is essential as society becomes more connected. We provide a focal point for researchers to rally around and engage in unlocking the power of the increased connectivity between people places and things. We achieve this through an active program of events, fostering communities, supporting the next generation of researchers and facilitating interactions and supporting new activates through research funding.

Seed Funding 2017

Our key investment vehicle is the annual seed funding process. In 2017 we streamlined the seed funding process lowering the barriers to entry by requesting a two-page Expression of Interest from potential applicants. The response was overwhelming, resulting in 40 innovative interdisciplinary applications from the University's research community. Of these twelve were shortlisted for interview, with eight projects receiving funding in 2017:

- Artificial Intelligence and Bipolar Disorder (page 19)
- Coworking Ecologies and the Future of Work (page 18)
- Fighting Fake News (page 20)
- Immersive Education in Aboriginal History (page 19)
- Personalised care for people with Type 2 Diabetes (T2D) (page 19)
- Project MyCampus (page 21)
- A Sensor-Enabled Campus (page 21)
- Social Robots for Older People (page 23)
- Virtual Reality Limbs (page 22)

Two additional projects emerged from the Seed Funding process. These where *#MisCOURAGE Down Under* (page 16) which received funding through the NSI Lab funding and *Game Engines in the Australian Video Game Industry* (page 25) funded by the Institute and the Centre for Media and Communications Law at Melbourne Law School and the Intellectual Property Association of Australia.

Return on investment

A central aspect of the Networked Society Institute is the need to generate a return on investment to the University based upon the funds provided to the Institute to further interdisciplinary research. This occurs in part through the facilitation and enablement of new and innovative research projects. Since our establishment as the Institute for a Broadband-Enabled Society we have delivered strong returns on investment delivering a return of 3.54 to the University. In 2017, we were delighted to continue this trend as evidenced by the following projects.

Seed Funding Outcomes

Five projects received funding from the Australian Research Council (ARC) and National Health and Medical Council (NHMRC) to build upon the initial Institute seed funded research. These projects are:

- *Aboriginal Remote Narrowcast TV and the Audiovisual Archive* (ARC Discovery Indigenous Grant IN180100014) - $573,032
- Disposal of the dead: beyond burial and cremation (ARC Discovery Project DP180103148) - $292,035
- Harnessing optical metasurfaces for reconfigurable optoelectronic devices (ARC Discovery Project DP180104141) – $453,334
- Development of far Infrared multispectral thermal image sensors (ARC Linkage Project LP160101475) – $330,000
- Enhancing Social Functioning in Young People at Ultra High Risk (UHR) for Psychosis: RCT of a Novel Strengths-based Online Social Therapy (NHMRC Project 1142135) – $1,543,656

NSI Lab collaboration with St Vincent's Hospital

A collaboration between technical expertise at the NSI Lab and researchers at St Vincent's Hospital led to the development of a tool to support the assessment of total knee replacement surgeries. This engagement provided the foundation for a $1,091,926 NHMRC Partnership Project for Better Health *Closing the evidence-practice gap in total knee replacement: optimising evidence-based decision-making through a multi-dimensional surgeon feedback intervention* (1122983). For further information see page 16.

Institute Fellows

Dr Victoria Palmer, Institute Fellow (Applied Ethics) received $1,487,356 in funding from the NHRMC for the project *Assertive Care: a randomised trial to reduce cardiovascular risk for people with severe mental illness* (1141344). The project will develop an assertive care intervention to identify, assess, treat, and follow up to reduce cardiovascular risk in patients with severe mental illness.

Dr Laura Tarzia, Institute Fellow (Domestic Violence) received $150,755 in funding with Department of General Practice colleagues Prof Kelsey Hegerty and Kirsty Forsdike from the NAB Domestic and Family Violence Support Grant: Seed Funding for a project *Intervening early with men who use violence in their relationships*. The project builds upon work the team have undertaken testing the acceptability of a healthy relationship tool for men who use violence in their relationships.

Government and Industry Grants

The Institute's also supports applications across different categories of funding. The State Government of Victoria awarded $140,000 in funding as part of the Victoria-Jiangsu Program for Technology and Innovation R&D for a collaborative research project with Chusan Technology to develop a wirelessly charged, smart wearable system to monitor the health and safety conditions of staff working in difficult conditions, for further information see page 24.

The Royal Australian College of General Practitioners (RACGP) and Diabetes Australia provided a research grant of $60,000 for *Personalised care for people with type 2 diabetes.* This seed funded research project is creating a tool to enhance the personalised care for people with Type 2 Diabetes (T2D), see page 19.

The *Eyes On Road: Intelligent Smart Sensors For Road Safety* project received $100,000 from the Transurban Innovation Challenge Grant to test the feasibility of a novel solar sensor system to monitor speed and improve road safety.

Our People

Institute Staff

Our dedicated staff support our research community and manage the administrative and research activities of the Institute. Everything from undertaking innovative research, to taking notes at meetings, or developing applications in the Lab, through to running events for five hundred attendees – this team gets it done.

In 2017, two Deputy Directors were appointed to support the Institute Director. Prof Scott McQuire was appointed Deputy Director (Research) supporting leadership and management of the Institute within the University. Scott is a distinguished researcher in the field of Media and Communications and has a long-standing association with the Institute being a member of the Executive Committee since the Institute's establishment.

Ken Clarke is Deputy Director (NSI Lab) and supports the activities of the Institute operationally through the oversight and management of the technical resources and capabilities hosted within the NSI Lab. Ken is has been with the Institute since 2010 and has been actively involved across a number of leading-edge interdisciplinary research projects.

Additional employees to join the team in 2017 include Dr Chien Aun Chan who commenced at the Institute as a Research Fellow working on the *Smartwear for Workplace Health and Safety* project. Robbie Fordyce is our inaugural Doctoral Academy Convenor. Robbie was an institute top-up scholarship recipient and finalised his PhD in 2017. Finally, Peter Hormann joined the Institute as an Honorary Enterprise Fellow.

Directorate

Prof Thas Nirmalathas
Institute Director

Fiorella Chiodo
Executive Assistant

Roger Hughes
Finance Manager

Adam Lodders
Executive Officer

Kate Murray
Communications Officer

NSI Lab

Ken Clarke
Deputy Director (NSI Lab)

Anchalee Laipraset (Mai)
Software Engineer

Yunhan Li
Software Engineer

Scott Cameron
STEM Research Assistant

Researchers

Prof Scott McQuire
Deputy Director (Research)

Dr Chien Aun Chan
Research Fellow

Dr Chamil Jayasundara
Research Fellow

Robbie Fordyce
Doctoral Academy Convener

Peter Hormann
Honorary Enterprise Fellow

Executive Committee

The Executive Committee is responsible for managing the research program of the Institute, approving allocations of research seed funding to Institute researchers, and ensuring that all research programs align with the Institute's goals and objectives. At the end of 2017, Prof Tom Kvan stepped down from the committee, while earlier in the year both Prof Terrence O'Brien from the Royal Melbourne Hospital and Prof Frank Vetere from the School of Computing and Information Systems resigned from their roles.

Members 2017

Prof Thas Nirmalathas
Institute Director

Prof Scott McQuire
NSI Deputy Director (Research)
School of Culture & Communication

Ken Clarke
NSI Deputy Director (NSI Lab)

Adam Lodders
NSI Executive Officer

Prof Peter Gahan
Director, Centre for Workplace Leadership,
Faculty of Business & Economics

Prof Jane Gunn
Head, Department of General Practice
Melbourne Medical School

Prof Chris Leckie
Professor, Computing and Information Systems
Melbourne School of Engineering

Prof Tom Kvan
Melbourne School of Design

A/Prof Ruth Nettle
Leader, Rural Innovation Group
Faculty of Veterinary and Agricultural Services

Prof Terrance O'Brien
Medicine, Royal Melbourne Hospital

Prof Elizabeth Ozanne
Department of Social Work
Melbourne School of Health Sciences

Prof Megan Richardson
Professor of Law, Melbourne Law School

Advisory Board

Our Advisory Board assists the Institute to achieve its objectives and to maximise the influence, impact and engagement. The Advisory Board provides extensive industry experience to support the research objectives. In 2017 Advisory Board members were invited to participate in the seed funding selection process.

New Advisory Board Chair

Brian Fitzpatrick was appointed new Chair of our Advisory Board. Brian is Principal Account Executive at Dialog Information Technology and brings a wealth of expertise and experience to the position. The Institute's Vice-Chair is Tim Fawcett, Head of Corporate Affairs at Cisco. Tim has been a valuable member of the Advisory Board for many years and a welcome face at our events and we know he will help steer the Board with an expert hand.

Farewell to Steve Wood

This year we said a fond farewell to Steve Wood, who served as the Chair of the Institute's Advisory Board since its inception as the Institute for a Broadband-Enabled Society (IBES).

Steve Wood is Vice President of Asia Pacific at Aruba, a Hewlett Packard Enterprise company. As Advisory Board Chair, Steve made an active contribution to the Institute providing leadership across the corporate and technology sectors. Steve was a champion of the Institute's activities and worked to raise the profile and resources of the Institute while Chair. Thanks to Steve, the Institute is well regarded across industry as a leading place for research related to the networked society.

Additional Board Movements

There were a number of other changes to our Advisory Board ensuring representation covers the breadth of the networked society. Genevieve Bell from Intel and Mark Ablett from Hitachi retired from the board. Anthony McLachlan from Ciena with his colleague Matthew Vesperman taking over his position. We also welcomed Ben Rimmer CEO of the City of Melbourne and Cheryl George from CSIRO Data61.

Advisory Board 2017

Brian Fitzpatrick (Chair)
Principal Account Executive, Dialog Information Technology

Tim Fawcett (Vice Chair)
Head of Corporate and Government Affairs, Cisco

Kate Cornick
Chief Executive Officer, LaunchVic

Cheryl George
Group Leader - Government Business and Stakeholder Engagement, CSIRO Data61

Chris Hancock
CEO, AARNet
(Alternate: John Batchelder)

Carolyn Phiddian
GM for Programmable Networks in Chief Technology Office, nbn

Ben Rimmer
Chief Executive Officer, City of Melbourne

Emilio Romeo
CEO, Ericsson Australia and New Zealand
(Alternate: Lewis Fricker)

Matthew Vesperman
Managing Director, Australia and New Zealand, Ciena

Institute Fellows

Institute Fellows are at the forefront of understanding the impact of the networked society. Fellows actively support the Institute's activities through research, outreach and collaboration. The Institute Fellows program enables the Institute to cultivate deep engagement across the University. The fellows provide a building block of expertise across a number of central concerns related to the networked society.

In 2017, we welcomed four new Fellows to the fold. Dr Lynda Ball joins as a fellow in STEM Education. Lynda is a Senior Lecturer in the Melbourne School of Graduate Education specialising in Mathematics Education. Lynda has been involved with the Institute's activities in various guises since 2010. Recently, she has been driving the Institute's *STEM Education Resource Platform* project.

Dr Sigfredo Fuentes is the Institute Fellow for Digital Agriculture, Wood and Wine. Sigfredo a Senior Researcher and Lecturer in Agriculture, Food and Wine Sciences at the School of Agriculture and Food in the Faculty of Veterinary and Agricultural Science. Sigfredo has been an integral part of numerous Institute research projects focusing on the use of digital tools to monitor the water-health of plants and the quality of grapes following bushfires.

Ben Loverage is a long-standing member of the Networked Society Institute's community and joins the Institute as a Fellow in Virtual Reality. Ben has been involved in several research projects including *Music Therapy in Virtual Environments* and *Virtual Reality Therapy for Youth Mental Health*. Ben co-ordinates the University's Virtual Reality Lab where he supports teaching, research and engagement related projects that involve immersive media applications.

Our fourth fellow for 2017 is Dr Vanessa Teague who joins us as a Fellow in Cybersecurity and Data Privacy. Vanessa is interested in cryptographic protocols that supports a free and democratic society. Her research group fills a gap between what governments need to know or build and what commercial operators have an incentive to tell or sell to them.

Institute Fellows 2017

Dr Lynda Ball
STEM Education

A/Prof Richard Chenhall
Digital Anthropology

Dr Sigfredo Fuentes
Digital Agriculture, Food and Wine

Prof Chris Leckie
Data and Security

A/Prof Kwanghui Lim
Innovation

Ben Loveridge
Virtual Reality

Dr Bjorn Nansen
Digital Media

Prof Marimuthu Palanswami
Connected Devices

Dr Victoria Palmer
Applied Ethics

A/Prof Andrew Roberts
Privacy

Prof Peter Taylor
Networks and Traffic Processes

Dr Laura Tarzia
Domestic Violence

Prof Stephan Winter
Urban Connectedness

PhD Students

The Institute issues a number of scholarships to high-calibre students to undertake innovative interdisciplinary research. In 2017, we extended the reach of our students through the establishment of our Inaugural Doctoral Academy, see page 30.

In 2017, we welcomed one new student to the Institute, Fernando Lasso.

Fernando Lasso

Fernando Lasso is a Colombian national and joined NSI in January 2017 to start his PhD studies. He had already successfully completed a Masters of IT at the University of Melbourne and had worked with the NSI team previously as an intern on an Internet of Things (IoT) project based on the latest network protocols. For his PhD, Fernando has now turned his attention to the world of Software Defined Networks (SDN).

SDN is used by large telecommunications companies worldwide to facilitate flexible and rapidly reconfigurable network operation and management. His particular interest lies in the research and development of new network protocols that will work with SDN to enable robust and reconfigurable, low cost and low power IoT sensor networks.

PhD Students

Estelle Boyle
Culture and Communication

Mediating social exclusion: ICT access in Australian refugee communities

Alexa Scarlata
Culture and Communication

A Stream Come True? A Critical Assessment of the Impact of Streaming Services on Local Television Production in Australia

Mandy McKenzie
Department of General Practice

Testing technology–based interventions to assist family and friends of victims of domestic violence to provide effective support

David Cumming
Computing and Information Systems

Understanding the appeal and spectatorship of eSports as culturally and technologically situated practices

AC Blogg
Culture and Communication

Theorising contemporary urban data practices

NSI Lab

The NSI Lab is a central part of the Institute. The Lab provides an environment to actively undertake research and development activities that are creating the networked society.

Located within the Institute the Lab provides a physical space that allows for experimentation, prototyping, testing and demonstration of new applications and services. We have capabilities for software development across a number of languages and platforms, technology testing and education and training.

The NSI Lab is a leader in VR and AR development. This capability was enhanced in 2017 through the acquisition of new equipment to support research projects. The NSI Lab team plays an active role on a number of research projects and provides the technical backbone to ensure the delivery of high-quality VR/AR applications.

The Lab offers support to our research projects plus provides a space for events, participatory workshops and interactive demonstrations. In 2017 we ran a variety of events from Meetups for virtual reality enthusiasts, participatory research workshops, presentations, networking events, showcases for visiting delegates.

A number of NSI projects welcome the end user of their research or innovation to be a part of the design process so we can better cater to their needs such as STEM teachers. To assist with this interactive design process, the Lab has hosted a number of design workshops across the year.

Lab projects

There are a number of smaller scale projects hosted within the NSI Lab. These projects start as collaborations with a technical or development focus. They often provide the foundation for further engagement, research and development. In 2017 the NSI Lab supported three projects.

Virtual Reality Heart

Clinical educators Dr Charles Sevigny and Jairus Bowne from the Department of Physiology in the School of Biomedical Sciences are collaborating with the NSI Lab to create a VR experience that will help educate the next generation of cardiac specialists and surgeons. This joint initiative has created a highly-detailed virtual beating heart that can be manipulated (grab, rotation, magnification, pulse rate, etc.) with VR hand controllers. This allows close examination of individual components of the heart, which can also be individually turned off and on. This allows students to quickly and accurately understand how each part of the overall anatomical structure fits and works together. Traditional 2D textbook figures simply cannot convey this complex 3D structural and motion information.

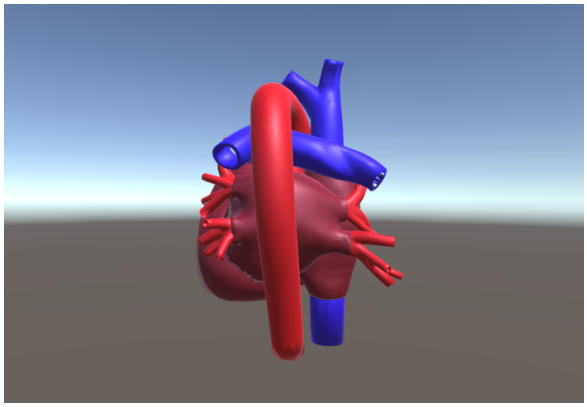


Figure 2: VR Heart

Closing the evidence-practice gap in total knee replacement

The evidence-to-practice gap for the surgical management of advanced osteoarthritis (OA) of the knee is costly and potentially harmful. This project is improving the uptake of evidence-based criteria by implementing and evaluating a novel surgeon feedback intervention for those performing total joint replacement. Total knee joint replacement (TKR) is the only proven effective surgical procedure for managing advanced knee OA. While TKR has revolutionized the treatment of patients crippled by knee OA there is growing concern related to cost, demand and dissatisfaction that compels a reassessment of how this procedure should be best deployed. In 2015 57,000 Australians received TKRs, representing an increase of 77% since 2003[2, 3]. However an estimated 25% of TKRs are performed in inappropriate candidates according to evidence based criteria and a similar proportion do not report a clinically meaningful response to surgery. Wide variations in treatment practice exist despite the existence of validated appropriateness criteria for TKR. There is substantial evidence that audit and feedback can effectively improve quality of care and that exposure to decision making aids leads to less varied and more accurate judgments of operative risk among surgeons. The aim of this study is to address inappropriate practices through innovative approach involving audit/feedback, decision aids to support clinical decision-making and the promotion of effective non-operative treatments.

The NSI Lab is leading the development of the SmartApp that will provide a clinical support tool for surgeons. This NHMRC project is a partnership between academic researchers and St. Vincent's Health Australia (SVHA), the Australian Orthopaedic Association (AOA), Medibank and MOVE.

#misCOURAGE Down Under

This project received small scale NSI Lab funding through the Seed Funding round to support the development of a website to enhance understanding and knowledge about miscarriage. This project is exploring women's online health seeking behaviours at the time of miscarriage and their views on the design and content of a website to host The Australian #misCOURAGE Campaign. The team will use the information from interviews and a focus group with women who have experienced miscarriage to develop and refine a pregnancy related website which will ultimately provide information, advice, support and resources for women affected by miscarriage and host The Australian #misCOURAGE Campaign and Survey.

Research Team

Prof Meredith Temple-Smith
Department of General Practice

Dr Jade Bilardi
Department of General Practice

Dr Patrick Pang
Computing and Information Systems

Dr Van-Hau Trieu
Computing and Information Systems

Dr Litza Kouropolous
Melbourne School of Psychological Sciences

Interns

The NSI Lab hosts a number of student interns who work on a variety of real world problems to support and enhance their education, while furthering the research activities of the Institute. In 2017, 18 students were hosted in the NSI Lab.

MIT Interns

Siyu Feng
Big Data Analysis (Research Project)

Di Mao
Google SER Project

Shiyu Jin
Kinect for VR Tracking

Anni Piao
Student Calculator Usage Tool

Quang Pham
Facial recognition (Research Project)

Siyu Feng
SDN Network Analysis (Computer project)

Bo Ma
GIS NBN asset placement tool

Boqin Hu
Pulse Oximetry App for Ghranite

Cecily Shen
Maths Fraction Learning App: UI

Dexiao Ye
Maths Fraction Learning App: back-end

Quang Pham
Facial recognition (Computer Project)

Kangyi Wang
NARI Mental Health Literacy App

School Interns

Eamon Goldsmith
Robo-pourer

Andrew Lee
VR Youth Mental Health

Other Interns

Honghao Li, Yixiao Zhoa and Yongzhao Chen
Capstone student team

Verra Mukty (International Student Intern)
MyHealthRecord App

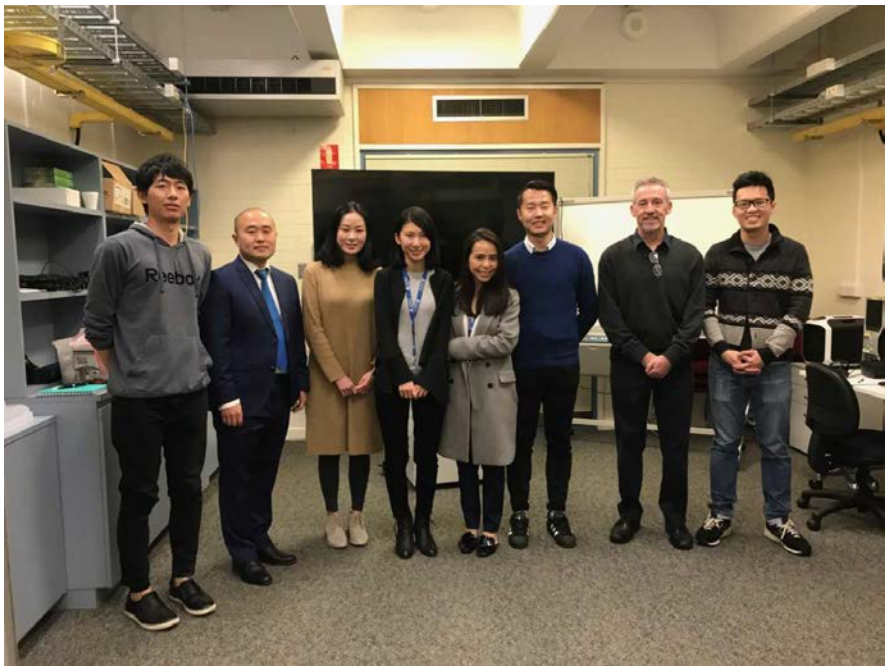


Figure 3: Semester One 2017 Interns in the NSI La: Siyu Feng, Bo Ma, Anni Piao, Yunhan Li (NSI), Anchalee Laipersert (Mai) (NSI), Boqin Hu, Ken Clarke (NSI), Quang Pham

New Research Projects

Coworking Ecologies and the Future of Work

Coworking has evolved from a niche activity to a recognised model of work in cities and regional centres around the world. Despite the increasing presence of coworking spaces in cities and their growing role in urban policy, little is currently known about how coworking is transforming work practices. Empirical and conceptual research on these spaces and practices is therefore urgently required to evaluate the impact of coworking on contemporary life.

This project examines coworking spaces in Victoria in the context of scholarly and popular discourses on the 'future of work'. The project researches coworking from three perspectives:

- **Ethnographic:** Through site observation, residencies and interviews with managers and users, it creates rich profiles of coworking spaces representing different industry sectors across varied geographical and socioeconomic regions in Victoria.

- **Structural:** Linking data, policy analysis and scholarly literature to the profiles above, the project maps the broader ecology (economic, social and infrastructural) which both shapes and is shaped by coworking.

- **Conceptual:** Integrating the ethnographic profiles and structural mapping work above, the project develops a framework for understanding different coworking models and their impact on the new generation of future work.

Research Team

Prof Scott McQuire
Culture and Communication

A/Prof David Bissell
Geography

Dr Rachelle Bosua
Computing and Information Systems

Dr Dale Leorke
Melbourne School of Design

Dr Danielle Wyatt
Research Unit in Public Cultures

External Collaborators

Dr Mladen Adamovic
Centre for Workplace Leadership

Dr Marianne Gloet
Centre for Workplace Leadership

Dr Deborah Towns
Centre for Workplace Leadership

Sarah Slade
State Library Victoria

Bree Trevena
Arup Foresight, Research + Innovation

Immersive Education in Aboriginal History

This project bridges gaps in Aboriginal History education by consolidating political histories of Aboriginal activism with knowledge generated by student experiences within a virtual reality environment.

The virtual environment will be created as a proof-of-concept created in the NSI Lab that replicates audio-visual content resourced from the Aboriginal History Archive (AHA), specifically the 1972 Aboriginal protest at the Tent Embassy in Canberra in 1972.

The environment will deliver an immersive education experience that supports the advancement of the Australian Curriculum with innovative technology use.

Research Team

A/Prof Gavan McCarthy
e-Scholarship Research Centre

Dr Sharon Huebner
e-Scholarship Research Centre

Prof Gary Foley
Moondani Balluk Academic Centre, Victoria University

Dr Edwina Howell
Moondani Balluk Academic Centre, Victoria University

External Collaborators

Prof John Maynard
Indigenous Education and History, University of Newcastle

Prof Larissa Behrendt
Indigenous Research, University of Technology Sydney

Personalised care for people with Type 2 Diabetes (T2D)

Nearly 10% of deaths in Australia are because of diabetes, mostly T2D. Keeping glucose levels in target range is a key strategy in reducing death and complications from T2D. Getting glucose levels to target is, however, a challenge for people with T2D and for their health professionals (eg GPs, Diabetes Educators, Endocrinologists).

This project is exploring the clinical reasoning that clinicians and patients use when personalising glucose targets and treatments to develop a prototype clinical decision support tool based on algorithms developed from this clinical reasoning.

The prototype will form the basis of a configurable, generic application for multiple health conditions that can be incrementally developed and deployed in general practice and related sectors.

Research Team

A/Prof John Furler
Department of General Practice

A/Prof Douglas Boyle
Health and Biomedical Informatics (HaBIC)

Dr Jo-Anne Manski-Nankervis
Department of General Practice

A/Prof Gary Kilov
Department of General Practice

Ken Clarke
Networked Society Institute

External Collaborators

Prof Jane Speight
Behavioural and Social Research in Diabetes
Deakin University

Artificial Intelligence and Bipolar Disorder

This project is developing an AI Smartphone solution to predict and prevent clinical relapse in bipolar disorder. Bipolar affective disorder (BPAD) is a severe and chronic mental illness characterised by episodes of mania and depression. Lifetime prevalence of BPAD is around 3.5% and mortality due to suicide around 60%. Early recognition of relapse signatures is exceptionally difficult leading to delay in treatment and associated harms. This project seeks to develop a platform for people with BPAD that uses electronic markers to generate a probability statistic of onset of a manic or depressive episode. The technology will securely alert a treating psychiatrist if a diagnostic threshold is triggered to enable early intervention.

Research Team

Dr Mahesh Jayaram
Department of Psychiatry

Prof Christos Pantellis
Melbourne Neuropsychiatry Centre

Dr Andrew Zalesky
Melbourne School of Engineering

Prof James Bailey
Computing and Information Systems

Dr Elham Naghizadeh
Infrastructure Engineering

External Collaborators

Prof Clive Adams
Independent Scientific Advisor, University of Nottingham

Fighting Fake News

The emergence of fake news and misinformation online highlights the difficulty of determining the quality of information distributed through the networked society. This project seeks to enhance our understanding of how people make sense of information they find online and exploring ways to help people identify misinformation and overcome misconceptions.

The methodology involves a combination of in laboratory and in the wild studies to understand what psychological factors explain and predict how people come to believe misinformation.

The team will develop a proof of concept approach using data and analytics to predict when and how interventions can be introduced to assist people to develop skills in critically evaluating information online.

Research Team

Dr Jason Lodge
Melbourne Centre for the Study of Higher Education

Dr Rachel Searston
Melbourne Centre for the Study of Higher Education

A/Prof Fiona Fidler
School of BioSciences & School of Historical and Philosophical Studies

Prof James Bailey
Computing and Information Systems

Dr Daniel Little
School of Psychological Sciences

Project MyCampus

MyCampus will turn the Campus into a living lab for education and experimentation in participatory sensing and citizen engagement providing a “Wix for Social Applications” and education course.

The platform will provide the basis for interdisciplinary groups (to fast prototype proof-of-concepts, promote filed tests, community engagement, and participation. The team seeks to build an interface to “bring people together” and facilitate community building.

The education course will teach how to work with the infrastructure, IoT, mobile services, data science, and social computing. These skills are essential for the education background of the new generation of professionals.

Research Team

A/Prof Michael Kirley
Computing and Information Systems

Dr Fernando Koch
Melbourne School of Design

Dr Jan Dethlefs
Facilities Services

Dr Eduardo Oliveira
Computing and Information Services

A Sensor-Enabled Campus

There is a problem enabling Internet of Things (IoT) operations across the University. This project is seeking to develop an infrastructure to enable deploying IoT and making IoT observations accessible through a standard interface.

The Sensor-Enabled infrastructure will enable the ability to deploy IoT devices, aggregate their data and integrate their data with a variety of sensors to create a holistic IoT-enabled campus. The project will lower the barriers for students, researchers and practitioners to develop innovative solutions and experiment with new IoT devices.

The infrastructure will transform the campus ecosystem, enabling the University campus as a site of research supporting inquiry across a range of domains including intelligent buildings, sustainability, wellbeing, agriculture and advanced manufacturing among others.

Research Team

Dr Mohsen Kalantari
Infrastructure Engineering

Dr Fernando Koch
Architecture, Building and Planning

Mr Mark Morris
University Services

Dr Behzad Rismanchi
Infrastructure Engineering

Dr Soheil Sabri
Infrastructure Engineering

A/Prof Tansu Alpcan
Electrical and Electronic Engineering

Virtual Reality Limbs

This project will combine stimulating virtual reality environments with real-time biomechanical data from wearable sensors to facilitate highly motivating and personalised rehabilitation for stroke and brain injury patients.

This will be achieved by combining stimulating virtual reality environments through a VR-headset with engaging augmented-reality 3D video games to motivate upper limb motion tasks. Low-cost wearable sensors including motion and electromyography (EMG), will be employed to provide real-time biomechanical feedback during therapy, including visualisation of limb motion, muscle loading and task performance.

Biomechanical data will be integrated into the video games, displayed in the virtual environment, and used to create a highly motivating and enjoyable therapy. Biomechanical data will be logged for access and use by clinicians to monitor patient performance and compliance.

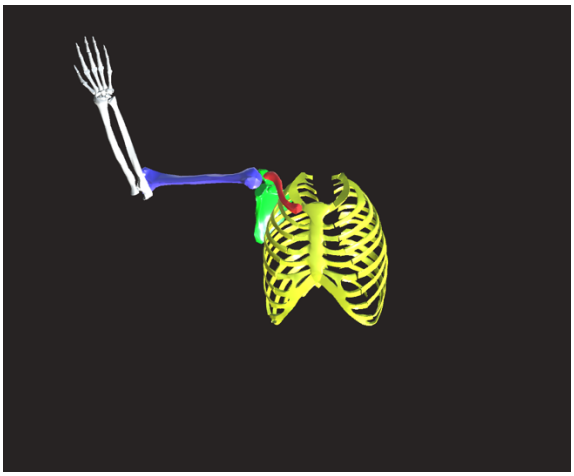


Figure 4: Screenshot from VR and Limbs system

Research Team

Dr David Ackland
Biomedical Engineering

Wen Wu
Biomedical Engineering

Dr Vijay Rajagopal
Biomedical Engineering

Prof Peter Lee
Biomedical Engineering

Prof Mary Galea
Department of Medicine

Dr Eduardo Cofre Lizama
Department of Medicine

Social Robots for Older People

This project will examine the acceptance and social and ethical implications of social robots possessing companion/assistive functions for older adults who live independently but are supported by aged care services.

The project addresses gaps in the current robot literature. In contrast to existing studies, we will: deploy Paro, Google Home, and Matilda in the homes (as opposed to residential care) of 12-18 older adults; interview participants and care providers before and after robot deployment; explore emotional responses and attachment to both companion and assistive robots.

The project aims are to investigate the acceptance, emotional outcomes, and ethical issues concerning social robots. The team are exploring both assistive and companion robots for older adults in supported, independent living.

Findings from this project will support the design of preliminary guidelines containing ethical and practical advice on the beneficial design and deployment of social robots with to enhance human wellbeing.

Research Team

Dr Jenny Waycott
Computing and Information Systems

Dr Barbara Barbosa Neves
Social and Political Sciences

Prof Frank Vetere
Computing and Information Systems

External Collaborators

Dr Simon Coghlan
School of Philosophy, Australian Catholic University

Prof Rajiv Khosla
Human Centred Innovations

Smoke Taint in the Digital Vineyard

This project builds upon the findings of the Digital Vineyard project. It proposes a non-invasive detection system for smoke contaminants in leaves, canopies and berries using remote sensing techniques through proximal (for leaves and berries) and unmanned aerial vehicles (UAV) for canopies. Data analysis and model construction will be performed using machine learning algorithms.

The smoke detection method proposed, and single model developed for seven cultivars, can offer grape growers a quick, affordable, accurate, non-destructive and in-field screening tool that can be used for differential harvest of fruit and respective winemaking.

Research Team

Dr Sigfredo Fuentes
Food and Agriculture

Dr Eden Tongson
Veterinary and Agricultural Sciences

External Collaborators

Dr Roberta De Bai
University of Adelaide

Dr Baofeng Su
North West University of Agriculture and Forestry, China

Smartwear for workplace health and safety

This research project is supported by the Victorian Government's Victoria-Jiangsu Technology R&D Scheme. In collaboration with Chushan Technology this project is developing a wirelessly charged, smart, wearable system to monitor the health and safety conditions of staff when working in difficult environments such as mining, construction, factories, farming, and emergency services to increase workplace productivity and safety.

The system consists of a health monitoring command centre realised in the computing cloud that is connected to sensors integrated into the working gear including a wristband and motion sensors embedded in knee pads that wirelessly communicate and continuously evaluate workers' physical daily work and productivity.

The outcome of this project will be the first prototype of the smart wearable system and sensory working gear that consist of the following innovations:

- a new low-power and low latency wireless body area network that connects multiple sensors;
- new algorithms and data analytics methods to measure health metrics of workers including level of fatigue, dehydration, and osteoarthritis;
- real-time health monitoring and alert system; and
- magnetic resonance-based wireless charging technology.

Victorian Research Team

Prof Thas Nirmalathas
Networked Society Institute

Dr Chien Aun Chan
Networked Society Institute

Prof Elaine Wong
Electrical and Electronic Engineering

Prof Chris Leckie
Computing and Information Systems

Dr André Gygax
Centre of Business Analytics

Dr Mohsen Kalantari
Infrastructure Engineering

Ken Clarke
Networked Society Institute

Dr Mark Merolli
Deakin University

Chushan Technology Research Team

Dr Peng Hao
CEO

Jianguo Cui
Director of Hardware and Supply Chain

Chen Zhou
Director of Software and Cloud R&D

Game Engines in the Australian Video Game Industry

Game engines are software toolsets and proprietary frameworks that enable videogame content to be produced and published on a variety of platforms. They manage low-level computational routines such as rendering, physics, and artificial intelligence, thereby allowing programmers to focus on more creative aspects of the design process.

Today, game engines such as 'Unity' and 'Unreal' comprise a significant yet largely under-examined offshoot of the videogame industry. They are said to demystify the process of game design such that even people from non-programming backgrounds can now make and distribute games. Yet, surprisingly little is known about how game engines are actually used and implemented in professional and amateur game design contexts.

This project is interviewing Australian game designers, educators, and students, to investigate the impact of game engines in the Australian videogame industry. It focuses on game engines through three lines of inquiry: as technologies that reconfigure the landscape of game design; as intermediary platforms that bring together different industry groups; and as legal or proprietary frameworks.

This project is supported by a research grant jointly funded by the Intellectual Property Research Institute of Australia, the Centre for Media and Communications Law, and the Networked Society Institute.

Research Team

Dr Bjorn Nansen
Culture and Communication

Prof Megan Richardson
Melbourne Law School

Dr Benjamin Nicoll
Culture and Communication

Research Collaborators

John Sietsma
Unity Technologies

Dr Dan Golding
Media and Communication
Swinburne University of Technology

Dr Helen Stuckey
Digital Design Cluster
Royal Melbourne Institute of Technology

Dr Brendan Keogh
Digital Media Research Centre
Queensland University of Technology

Continuing Research Projects

Projects that have been funded in previous years continue to undertake research and deliver results. A highlight for many of these projects was presenting their research-to-date at the Networked Society Symposium (see page 35). This section provides an overview of the key achievements made from our research projects in 2017.

Completed Research Projects

Mapping the Melbourne Sharing Economy

This project examined the impact of the sharing economy across Melbourne. The sharing economy has emerged from the increased ability to exchange, share, barter, lend and give through increased connectivity.

This 2015 seed funded project, published its final report in March 2017: *Mapping the Melbourne Sharing Economy*. The report provided the findings of this project where researchers mapped the landscape of this emerging economy within Melbourne, a recognised Sharing City. The research results speak to a wider cultural shift taking place where our idea of ownership and our relationship with possession is changing.

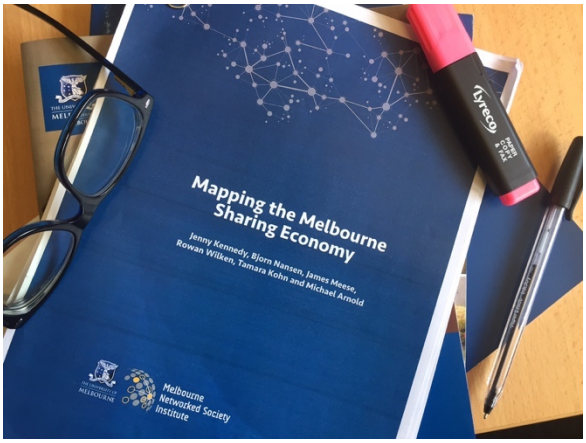


Figure 5: Mapping the Melbourne Sharing Economy Report

Continuing Developments

Urban Green Spaces

Our research continued to explore the value of urban green spaces. Three projects are collaborating to understand how connectivity can support the optimising the management, use and maintenance of our urban green spaces. The projects are:

- Sensor Networks for Urban Green Spaces
- Monitoring Urban Green Spaces
- Social Networks and Urban Green Spaces

The research teams coordinated their approaches with a central focus of their investigation being University Square located in the City of Melbourne.

The researchers presented their research in an interactive event as part of Melbourne Knowledge Week in May.

Figure 6: Urban Green Spaces Event, University Square

Virtual Reality in Health

The Institute continued to demonstrate leadership in using Virtual Reality for Health. Two projects are deploying innovative VR solutions to support the delivery of music therapy for people with quadriplegia, and to enable youth mental health. The two projects were showcased at a number of events such as Virtual Reality in Neuro-Rehabilitation in April delivered in conjunction with the Melbourne Neuroscience Institute.

Music Therapy in Virtual Environments

Researchers refined the Music Therapy VR application. They overcame the main technical challenge, which was ensuring a low-latency audio connection to allow participants to sing in real-time. The team trialled the prototype with participants at the Royal Talbot Hospital, where it was well received by patients.

This project is making a real difference to the lives of people with quadriplegia. The work was recognised nationally, with the project being a finalist in the 2017 National Disability Awards.

Figure 7: Figure 4: Researchers and patients test the Music Therapy VR Tool

Virtual Reality Therapy for Youth Mental Health

In 2017, the research team explored various scenarios to support the delivery of appropriate interventions via VR. The prototypes were refined throughout the year with the aim to test in 2018.

Driving for Health

The *Driving for Health* project funded in 2015 leveraged its initial investment and continued to build an engaging mental health app for taxi drivers. The ability to develop a richer application is due to the support received by the Shepherd Foundation in 2016. The additional funding has supported the optimisation of the app that has the potential to improve the mental health of the more than 60,000 people who work as taxi drivers in Australia.

Continuing Projects

A number of Institute projects continued their research in 2017. All projects that received funding in 2016 were featured at the Networked Society Symposium where researchers provided an update on the work to date. Continuing 2017 research projects not mentioned elsewhere in this report are:

- Active Defence
- Mapping Urban Mobility for Flu Forecasting
- Open Data in Practice
- STEM Education for Schools
- Internet of Things and Consumer Privacy
- Regulating Automated Legal Services

Data, Systems and Society Research Network (DSSRN)

The Data, Systems and Society Research Network (DSSRN - pronounced discern) is a collaborative research network focused on building a community of research scholars, and data infrastructure, to support internal collaborations and external partnerships, as well as sharing knowledge, tools and resources in the broad area of data, systems, and society.

DSSRN's mission is to help people to find each other, to critically evaluate the applicability of available tools, methods, and datasets, and to help them foster new and exciting ideas. The Network provides leadership across the University of Melbourne to facilitate the development of research initiatives, support collaborative research, and assist in forming research clusters in conjunction with suitable partners by planning and delivering targeted research events.

The Network's key mechanism is its Steering Committee, chaired by Prof Jodie McVernon (Doherty Epidemiology). DSSRN is supported by two talented Academic Convenors Dr Rob Moss (Population Health) and Suneel Jethani (Culture and Communication). The convenors represent different communities and bring diverse skill sets straddling science and the humanities to facilitate collaboration across the whole University.

Figure 8: DSSRN Workshop

In 2017 DSSRN continued to engage with individuals across all faculties and disciplines in sharing knowledge, resources and the shaping of data literacies. The Network supported University initiatives to develop, support and enable experts across a range of digital methods, technologies and research domains. The Network hosted a series of workshops to identify the requirements of digital research, and the processes and pathways to be put in place to ensure career development, retention and best practice for this workforce. This work identified shared challenges and emerging needs in digital research skills and capacity.

Academic Centre for Cybersecurity Excellence

As connectivity is increasing exponentially and an ever increasing proportion of existence is being carried out via networks, ensuring the safety and security of our networked infrastructure is an increasing concern. For an effective networked society cybersecurity is essential.

In 2017, the Commonwealth Government selected the University of Melbourne and Edith Cowan University to share $1.9 million in Federal Government funding as Australia's first Academic Centres of Cyber Security Excellence.

The Centres are a key pillar in leading Commonwealth efforts to build the cybersecurity expertise and job-ready skills needed by Australian industries.

The Centre will provide a focal point to further research relating to cybersecurity. Prof Chris Leckie an Institute Fellow and member of the Executive Committee will lead the Centre which is developing a training and research agenda that brings together expertise from the technical disciplines, law and the social sciences.

The Centre receives support and assistance from the Networked Society Institute and provides a focal point for University researchers to engage with pressing research issue.

The Centre will consolidate the long-term teaching and research focus on cybersecurity at the University of Melbourne. The Centre will also become a driver for increase collaboration across industry and the community to improve cybersecurity.

A key aspect of the Centre will be to develop the skills pipeline for cybersecurity in Australia. This activity, working closely with the Cyber Security Growth Centre, will ensure the Australian economy will have access to cyber security graduates and expertise. This will help strengthen existing industries and critical infrastructure, but also assist to build new jobs and businesses in this rapidly emerging sector.

To further the impact of the centre the Institute will be building a cluster of interdisciplinary research projects that ensure that the networked society is safe and secure.

Doctoral Academy

In 2017 we welcomed our first cohort of students to the NSI Doctoral Academy. The Doctoral Academy provides a forum for students to engage deeper in the activities of the Institute.

To foster an interdisciplinary research culture and build interdisciplinary research capacity at the University of Melbourne the Networked Society Institute is establishing a Doctoral Academy.

The Doctoral Academy brings together a cohort of PhD students who are engaged with research relating to the networked society. The Academy provides a forum for graduate research students to connect, collaborate and build interdisciplinary linkages.

The Academy connects students with the Institute, provides knowledge about the networked society and seeks to enable an interdisciplinary research culture. The Academy will provide support for students and seek to encourage and catalyse innovative research and development activity.

The Academy program runs for twelve months and consists of a series of seminars and workshops specifically designed for members. Doctoral Academy members will also be able to actively engage with the Institute's program of activities.

2017 Doctoral Academy

Thirteen students are members of our 2017 Doctoral Academy. The students come from a diverse range of disciplines across the University of Melbourne and are united in their connection to the questions, challenges and opportunities facing the networked society.

The Doctoral Academy is convened by Robbie Fordyce an Institute PhD Top-up scholarship recipient who has submitted his thesis for examination that addresses and accounts for a gap in the work of "post-autonomist" theorists of globalisation.

Academy Members

Fraser Allison
Interaction Design Lab, School of Computing and Information Systems

Fraser studies the ways people interact with virtual characters and personified software agents, and particularly the uses of virtual characters in voice interfaces.

AC Blogg
Media and Communications, School of Culture and Communication

AC's research focuses on the social outcomes of data use and its real-life implications for individuals.

Estelle Boyle
Media and Communications, School of Culture and Communication

Estelle's research interests focus on the interplay between the network society, migration, and experiences of belonging and displacement for people of refugee and migrant backgrounds, attentive to the social impacts of contemporary and historical communication methods.

Scott Cameron
Melbourne Graduate School of Education

Scott's research interests focus upon the use of technology, in particular Computer Algebra Systems, for the teaching and learning of Mathematics. Scott is also interested in researching how students' attitudes towards technology influence their use of technology in Mathematics.

David Cumming
Department of Computer Science

David's research revolves around aspects of eSports consumption, with a current focus on the relationship between materiality and eSports spectating practices.

Gerardo Luis (Ikee) Dimaguila
Health and Biomedical Informatics Centre

Ikee's research interests are measuring effects of the utilisation of person-generated health data.

Kim Doyle
Media and Communications, School of Culture and Communication

Kim's research interests are news in the network society, computational journalism, discourse analysis, new media and natural language processing.

Penny Gleeson
Melbourne Law School

Penny is researching the political legitimacy of the regulation of therapeutic goods in Australia. She is examining case studies including medicinal cannabis, medical abortion, stem cell therapies and genetic testing and editing. Penny's research interests include public health law; the ethical, legal and social implications of new technologies and public law and policy.

Donna L. Hensler
School of Film and Television, Faculty of VCA and MCM

Donna's research is related to digital archiving in the age of digital disruption. Donna is a Melbourne based film producer and the Screen Production Coordinator at the Victorian College of the Arts, School of Film and Television. She has been working in the arts and film industry for over 15 years, predominantly in film and TV production. She is currently embarking on a practice led PhD project, aimed at digitising, preserving and providing access to the audio-visual archive of Australia's oldest film school.

Kate Mannell
History & Philosophy of Science and Media & Communications

Kate's doctoral research explores how young people manage their social availability through mobile messaging and her research interests include technology resistance, mobile media, and the everyday use of digital communication.

Figure 9: Kate Mannell presents at the Networked Society Symposium

Jane Mavoa
Department of Computing and Information Systems

Jane is interested in the way that digital technology is reshaping the way that children play. This interest extends to the way that childhood itself, as a social construct, is re-negotiated in the face of increasingly ubiquitous media accessed through mobile and internet enabled technology. Her PhD project looks in detail at the game Minecraft, its use by children, and surrounding discourses of hope and concern for the future of 'childhood'.

Dana McKay
Department of Computing and Information Systems

Dana is interested in how human beings and technology meet in the quest to find and manage information. After ten years as a user experience researcher practitioner working in an academic library, Dana has recently become a full time PhD student at the University of Melbourne. She is a member of the iSchool there, and a recipient of a Google PhD fellowship in HCI.

Alexa Scarlata
Media and Communications
Cultural Studies – School of Culture & Communication

Alexa's research interests include the informal and digital distribution of video content, media piracy, and the cultural implications and political economy of transnational television programming.

Figure 10: Doctoral Academy Seminar

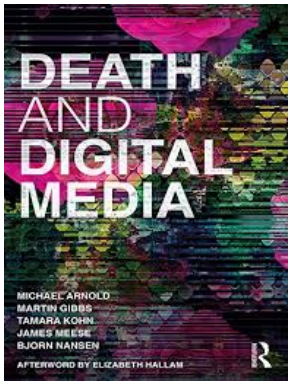
Impact and Engagement

Supporting Research Impact

The Networked Society Institute nurtures research to ensure that outcomes create a tangible benefit. Our impact is evidenced through how our seed funding is the catalyst for continuing bodies of research that explore the essential elements of what the networked society means to humanity. This is seen in many projects obtaining further funding to continue their research through to ensuring our projects share their stories across a range of mediums.

Death and Digital Media

One example of research impact is work relating to Digital Death. In 2010, the Institute provided seed funding for a project on Death, Grieving and Memoralisaiton.



Building upon their research, the research team was successful in receiving ARC funding for a larger project exploring death in the digital world. The findings of this project were published in a book in 2017, *Death and Digital Media*. The book provides a critical overview of how people mourn, commemorate and interact with the dead through digital media. It maps the historical and shifting landscape of digital death, considering a wide range of social, commercial and institutional responses to technological innovations.

To further their research in this area the team have been successful in securing an additional ARC Grant in 2017 to continue their research exploring the *Disposal of the dead: beyond burial and cremation*. The exploration of death and digital media shows the trajectory of a seed funded idea.

Telling our Stories

The Institute has a proactive approach to communications, where we share our stories to the world across a diverse range of media. In 2017, we continued to use a variety of channels to communicate our message to the world.

Being a connected institute, our website is our primary vehicle to deliver content. Over 10,000 people visited our website in 2017. We further enhanced our digital presence through the active use of Twitter and the publication of a regular newsletter. To improve understanding we created a short video that encapsulates the work of the Institute. This video was launched at the Networked Society Symposium. Finally, we continued telling our stories orally, with the continued release of episodes of our podcast *Networked Society Stories.*

Networked Cities in China

Prof Scott McQuire, Deputy Director (Research) has been increasing the impact of the research he leads focused on participatory public space through engagement with China. In 2016, Scott delivered a keynote presentation Fudan University in Shanghai. In December 2017 a follow-up event *Communicative Cities and Urban Space: Symposium and Workshop was* hosted by Fudan University. A number of Scott's publications have been translated into Chinese, including his 2016 book: *Geomedia: Networked cities and the future of public space.* The Chinese translations increase engagement with researchers across China enabling new collaborative opportunities as the country responds to the concurrent trends of digitalisation and urbanisation.

Facilitating Engagement

We have a proactive approach to engagement and relationship building. The Institute collaborates with a diverse range of people from other research organisations, industry, government, the not-for-profit sector and the public. An essential mission of the Institute is to increase awareness of the issues and opportunities of the networked society and to do this in a manner that facilitates collaborative engagement.

To achieve this end, we meet with a diverse pool of stakeholders to explore opportunities. We host delegations in the NSI Lab to share knowledge, ideas and demonstrate our research. We run a comprehensive program of events from research seminars, to collaborative workshops through to large scale public forums and our flagship Networked Society Symposium.

Visiting Delegations

The NSI Lab provides an opportunity to showcase our research to a wide audience. Visitors and delegations come into the Lab to see our demos and engage with our research projects.

In 2017 the Victorian Shadow Minister for Innovation, David Southwick visited the Institute and toured the lab. The Shadow Minister experienced our VR projects under development.

The Institute hosted two international delegations who were visiting Melbourne. The first was from the Faculty of Science and Technology, Prince of Songkla University, Pattani Campus in Thailand. While the second was a delegation from Beijing Municipal Commission of Economy and Information.

Figure 11: Philosophy of Technology Panel at Networked Society Symposium: Dr Andi Horvath (Moderator), Prof Thas Nirmalathas, Dr Jenny Waycott (Computing and Information Systems), Prof Luciano Floridi (Oxford Internet Institute), Dr Belinda Bennett (Swinburne University of Technology).

Networked Society Symposium 2017

The annual Networked Society Symposium was a fascinating day showcasing the breadth of interdisciplinary research from the Institute and exploring big ideas and issues surrounding the networked society.

Nearly 400 attendees enjoyed discussions on the philosophy of technology, presentations on urban green spaces, futuristic healthcare, and how the networked society is evolving.

23 researchers presented their work across nine interdisciplinary projects funded by the Institute. Key themes included Urban Green Spaces, Healthcare Technology, and Digital Transformation of Society.

A panel of thought leaders discussed the Philosophy of Technology, exploring ideas around how increasing connectivity has changed us as people and how we think. The panel was chaired by Dr Andi Horvath and included Institute Director Prof Thas Nirmalathas, Dr Belinda Barnet from Swinburne University, Dr Jenny Waycott from University of Melbourne and Prof Luciano Floridi from University of Oxford.

We were honoured to have Professor Floridi deliver the keynote speech. Attendees gave enthusiastic, and positive feedback about Floridi's talk which mixed philosophy, technology, and sustainability as its key themes.

The keynote was titled 'The Green and The Blue: The smart deal for a sustainable and preferable future'. It presented overviews to some of Floridi's notable works including the Fourth Revolution and looked to the future, asking questions about the sustainability of our increasingly connecting way of living.

The talk gave deep philosophical insight into the role of humans in an increasingly connected world that exists in a universe we no longer see as human-centred. Although it deals with heavy topics, Floridi peppered his talk with humour, Shakespeare quotes, and engaging visuals.

The Symposium saw the launch of our first hackathon, AutoHack18, a new extended-form hackathon on automation that ran over two months from December to January 2018.

We also launched a new video for the Institute that gives an overall view and feel of our work and interests.

Another highlight of the day was the poster presentations from our Doctoral Academy. The posters generated enthusiastic discussion in between sessions.

The Symposium brings together multiple elements of the Institute into one energetic and engaging event. We expect to make NSS18 even better yet!

Figure 12: Keynote Presentation by Prof Luciano Floridi

Events

February

8 400gGb/s and Beyond – Kim Roberts, Ciena

10 The Electric Empire, seminar – Robbie Fordyce, School of Culture and Communications

March

2 Urban Green Spaces workshop

10 Mapping the Melbourne Sharing Economy research paper launch

29 Smarter Cities: Critical for Australia's economic future – Warren Lemmens of Nokia

April

5 Virtual Reality in Neuro-rehabilitation: What does the future look like?

20 3D Printing in Medicine workshop

May

2 Unlocking the Value of our Urban Green Spaces (Melbourne Knowledge Week)

June

14 Seed Funding Workshop

July

27 Fact Factories: The travel of facts in the Digital Age – Dr Heather Ford, University of Leeds

August

17 This is Your Brain on Virtual Reality (Science Week)

27 Research to Reality: How to implement innovation (Digital Innovation Festival)

30 Creating and managing an innovative culture – Tolga Kurtoglu of PARC, A Xerox Company (Digital Innovation Festival)

September

25 Open Data in City Planning workshop

October

27 Networked Society Symposium 2017

November

14 Engineering Dean's Lecture event, Age of Drones: How unmanned aerial vehicles are changing our world

16 Mobile Communication Evolution: Industrial internet on the road to 5G – Nigel D'Rozario Ericsson, Australia and New Zealand

21 Why are foreign internet companies failing in China? – Yanbo Wang of National University of Singapore

23 Searching the perfect beat: principles of UX innovation at Samsung Research, Renata Zilse of Samsung Research

December

1 AutoHack18 launch and workshop event

12 Autohack18 first round Pitch Night event

13 AutoHack18 Blue Planet training day

Finance

Institute Expenditure	
Directorate operating & administration	
Directorate salaries	$375,781.88
Administration & General	$25,764.81
Communications & Events	$15,115.72
Subtotal operating expenditure	*$416,662.41*
Research Enabling	
Salaries (research-enabling staff only)	$779,771.38
Seed funding	$293,906.37
Partnership Development	$60,386.33
PhD scholarships	$77,720.39
NSI Lab Expenses	$29,716.21
Subtotal research enabling	*$1,241,500.68*
TOTAL EXPENDITURE	**$1,658,163.09**