



RDR NETWORK RESEARCH SUMMARY

**Building safer industries and communities
through impact-focused research and training**

The global risk landscape is becoming more volatile and complex across all scales – encompassing local to planetary boundaries. This new perspective is changing how industry, government and communities need to think about and manage risk. It is also driving the need for new forms of research specifically targeted to develop solutions that ensure future safety and sustainability. The specific role of the RDR Network is to bring together expertise from across Victoria University (VU) to enable systemic research that provides solutions to problems that cannot be solved by employing conventional means and methods. Our focus is understanding your risk research needs, and designing research that has impact. Our researchers are experienced in working alongside a diverse range of stakeholders to find practical solutions to risk-based issues.

Our members offer four different research approaches:

- > **Single disciplinary research** focuses on issues requiring a specific area of expertise and focus.
- > **Multidisciplinary research** uses more than one area of research to provide separate reports or outcomes that may fall under a common theme or area of interest.
- > **Interdisciplinary research** is where different disciplines inform, modify and enhance each other's work during the research process and the final outcomes provides a synthesis of these.
- > **Transdisciplinary research** brings together academic and industry knowledge and expertise to work collaboratively towards a shared outcome.

Our capabilities include:

- > identification and assessment of hazards expertise
- > development of innovative technologies, tools and methodologies
- > applied systemic thinking and decision making for complex problems
- > established and experienced end user-focused research practitioners
- > multi-level governance expertise, especially for managing risk and disasters at the policy/governance/practitioner interface
- > innovative economics that blend techniques and span conventional economics to assessment of public good, welfare and ecological economics
- > social and human risk and organisational/community behaviour and cultures expertise.

OUR RESEARCH PROGRAMS



For further information, please contact Celeste Young at celeste.young@vu.edu.au or 0423 951 422

FEATURED RESEARCH PROGRAMS



APPLIED ECOLOGY AND ENVIRONMENTAL CHANGE RESEARCH GROUP

The mission of The Applied Ecology and Environmental Change Research Group (AEEC) at VU is to provide high-quality multidisciplinary scientific research that is relevant, practical and applicable. Our goal is to achieve environmentally sound solutions at the local, national and international level.

Expertise

- > Ecology and management of inland and coastal wetlands
- > Grassland and orchid ecology, genetics and management
- > Molecular markers and candidate gene identification to assist accelerated crop breeding in agronomically important plants and endangered species conservation.
- > Striped Legless Lizard ecology and management.
- > Citizen Science: community engagement and co-created project development
- > Indigenous knowledge for improved climate resilience
- > Population genetics and gene flow in fragmented landscapes
- > Behavioural ecology with a focus on interspecific interactions
- > Spatial ecology: GIS, home range, species distribution and landscape connectivity modelling
- > Multidisciplinary research and collaboration
- > Remote fieldwork
- > Applied conservation management.

Contact

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BUILT ENVIRONMENT AND INFRASTRUCTURE RESEARCH

The Built Environment and Infrastructure research program forges collaborations among disciplines with similar interests and among industry, alumni, and international partners. The aim of the group is to facilitate advanced research in all aspects of sustainable built environments through designing efficient buildings, planning smart cities, creating more liveable places, adopting smart technologies, managing construction projects, and life performance of construction materials and components.

Expertise

- > Sustainable built environment
- > Urbanisation, environment and design
- > Greener and safer routes for energy production and storage for built environment
- > Construction
- > Building technology
- > Educational technologies and innovation
- > Project management.

Education

- > Bachelor of Architectural Design
- > Bachelor of Building Surveying, Graduate Diploma in Building Surveying. Accredited by the Australian Institute of Building Surveyors (AIBS) and endorsed by the Victorian Building Authority (VBA)
- > Bachelor of Construction Management (Honours), Master of Construction Management, Graduate Diploma in Construction Management, Graduate Certificate in Construction Management, Graduate Certificate in Digital Construction Management, Graduate Certificate in Sustainable Construction Management
- > Graduate Certificate in Performance-Based Building and Fire Codes
- > Master of Project Management, Graduate Diploma in Project Management, Graduate Certificate in Project Management.

Contact

Professor Zora Vrcelj – zora.vrcelj@vu.edu.au





CENTRE OF POLICY STUDIES

The Centre of Policy Studies (CoPS) undertakes economic modelling research for governments and businesses in many parts of the world. They are the creators of Australia's best known large-scale economic models – ORANI, MMRF and TERM. Versions of these models have been developed for over 25 countries. Their work areas include climate change, education, the impacts of urban planning, and the future workforce and skills.

Expertise

- > Economic analysis and modelling
- > Economic impact assessments
- > Policy assessment and analysis.

Contact

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COMMUNITY CENTRED ANTI-RACISM

The anti-racism research team acknowledges that combatting racism in all its forms requires resilience, long-term commitment of, and extensive collaboration between, multiple stakeholders. While those with lived experience must lead advances in anti-racism locally and nationally, the responsibility to 'fix' racism cannot be put on the shoulders of those who face it. This underscores the necessity of collaborative approaches to anti-racism, bringing together, among others, local, state and national government and various statutory agencies, education institutions, researchers and, most importantly, individuals and organisations from those communities affected by racism.

Reducing and eliminating racism is a long-term and multifaceted mission that requires place-based approaches that effectively combine the development and implementation of change-oriented bottom-up initiatives with top-down support and leadership. Since 2019, a particular focus of our research team has been to use our privileged positions to centre community voices, help communities create safe spaces to speak out against racism, and assist in changing reporting pathways and anti-racism support services in line with community needs.

Expertise

- > Identifying community experiences and needs in relation to anti-racism support through surveys, peer-facilitated community focus groups and community forums/workshops
- > Co-designing and implementing evidence-based local anti-racism roadmaps in collaboration with local communities and local governments
- > Capacity building training workshops for community organisations and local governments and their public facing staff
- > Evaluation of anti-racism initiatives

Contact

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CULTURE, SOCIETY AND CREATIVE COMMUNITIES RESEARCH

The Culture, Society and Creative Communities Research group focuses on the shifting boundaries around issues of racial and cultural diversity, gender, sexuality, and class, by responding to areas of cultural challenges through theory, creativity, and digital technologies. The group is composed of award-winning writers, artists and thinkers, and through the use of multiple mediums and diverse approaches they develop accessible research that has impact for those they work with.

Expertise

- > Narrative analysis, assessment and development
- > Analysis, assessment of ethics in research and practice
- > Cultural diversity analysis and assessment, and curriculum development
- > Digital content production
- > Risk and resilience analysis and assessment among asylum-seekers and migrant families .

Contact

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EARLY CHILDHOOD EDUCATION PROGRAM

We engage in research that values play, place and innovation and enriches the lives of children, families, the sector and the wider community. We have a particular focus in areas that support educators to provide the enabling environments and understandings needed to develop a sense of identity and belonging in childhood and strengthen families.

Expertise

- > Analysis and development of programs related to playwork, loose parts play and urban environments
- > Analysis and evaluation of best practice in early childhood education
- > Analysis related to early childhood experiences of trauma
- > Design and development of excellence in mentoring in early childhood contexts.

Contact

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GEOTECHNICAL, ROCK MECHANICS AND PAVEMENT RESEARCH

This research group focuses on fundamental and applied research that builds knowledge to make civil infrastructures more resilient, economical and sustainable. The group consists of leading researchers who apply innovation and creativity into research in a broad range of applications. Our state-of-the-art testing facilities and numerical simulation tools allow us to conduct cutting-edge research that makes positive impacts on society and the environment in line with United Nation's Sustainable Development Goals. We are capable of testing new pavement and geotechnical construction materials under normal and extreme conditions to develop resilient infrastructure.

Expertise

- > Performance testing of asphalt mixtures
- > Behaviour and improvement of the properties of expansive soils
- > Rock mechanics and rock engineering
- > Hydraulic fracturing and induced seismicity
- > Recycled materials in pavement and geotechnical infrastructures
- > Stress-strain response analysis of pavements.

Training

- > **Undergraduate:** Pavement Engineering and Geotechnical Engineering
- > **Postgraduate:** Advanced Pavement Engineering and Advanced Geotechnical Engineering

Contact

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HEALTH AND HUMAN CAPITAL ECONOMICS

The Victoria Institute of Strategic Economic Studies (VISES) undertakes its work with international agencies. The Institute regularly collaborates with organisations such as UNICEF, the United Nations, the World Health Organization, and the China Centre for Disease Control and Prevention to provide research and economic modelling of large-scale interventions to improve global health and wellbeing, productivity and health, and the role of women. Some of the multi-country evaluation studies VISES has conducted have estimated the benefit-cost ratios for interventions to treat disease and health conditions for children and mothers, those with mental health issues, and for a range of interventions to improve the wellbeing of adolescents.

Expertise

- > Local and international policy analysis
- > Economic development and health economics
- > Health intervention modelling.

Contact

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HUMAN BEHAVIOUR IN FIRE

The Human Behaviour in Fire program's focus is research into brain behaviour and cognition, analysis of how people respond during a fire event, and risk taking behaviours associated with fire. The team's applied and translational research takes place in clinical environments, communities, and workplaces.

Expertise

- > Juvenile firesetting awareness and intervention program development, assessment and analysis
- > Assessment and analysis of human behaviour in fire situations
- > Human responses to smoke alarms
- > Development and analysis of monitoring and evaluation programs.

Contact

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NEXT-GEN INFORMATICS AND TECHNOLOGY LAB

The aim of the Next-Gen Informatics and Technology Lab (NITL) program is to engage computer scientists, experts from application domains (including health, community, business and environments), industry and government partners to develop innovative information technology applications to benefit society. We also conduct research in developing smart technology that can solve contemporary social problems of our daily life to achieve a better living for community. A major focus of this is Artificial Intelligence (AI) that can use machine comprehension to extract semantic meaning. Our application areas include cyber security, healthcare, smart city, tourism and domestic violence.

Expertise

- > Analysis and indexing of social media
- > Automatic identification systems using social posts
- > Multi-modal emotion detection using deep learning
- > Educational DSS (decision support system) using machine learning
- > Smart city research
- > Digital construction.

Contact

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PREVENTING AND COUNTERING VIOLENT EXTREMISM

The Preventing and Countering Violent Extremism research team fosters and generates rigorous scientific research for the applied purpose of securing Australia from contemporary and future manifestations of violent extremism. The research program addresses political and ideological behaviour that undermines democracy and social cohesion, as well as poses threats to public safety. The team is particularly recognised for the collaborative way they work with stakeholders to collectively build evidence to ensure it meets their priority areas of response.

This research continues to develop new and better ways of understanding how and why people become engaged in violent extremism and translates into both informing and redeveloping protocols used nationally by state and federal policing and security agencies to prioritise threat and inform appropriate avenues of intervention, including diversionary programs, investigation and disruption, and disengagement programs. This program has an applied and translational focus that aims to have a positive social impact through building strong, safe, liveable, and inclusive communities.

Expertise

- > Identifying behavioural indicators of terrorism and violent extremism
- > Mitigating threats to public safety from terrorism and violent extremism
- > Resource prioritisation based on threats to public safety from terrorism and violent extremism.

Contact

Professor Debra Smith – debra.smith@vu.edu.au





REDUCING HOMELESSNESS IN COMMUNITIES

We support the development and evaluation of innovative community prevention programs to reduce those at risk from homeless and the underlying factors that cause this. We use place-based systems approaches and reflective community engagement practices to ensure holistic and useable outcomes.

Expertise

- > Homelessness program analysis, development and evaluation
- > The development of survey measures of housing and homelessness
- > Assessment and analysis on predictors of intimate partner violence
- > Development and analysis of measurement and evaluation.

Contact

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SUPPLY CHAIN AND LOGISTICS

The supply chain and logistics research group is cross-disciplinary. Our focus is on the innovative management of technology-enabled sustainable performance and productivity of various SMEs and large organisations in retail, pharmaceuticals, food and beverages, transport and agri-food sectors.

Expertise

- > Operations, supply chain and logistics management – supply chain strategy, value chain analysis, green procurement, waste management, humanitarian logistics, disaster and supply chain risk management
- > Emerging technology applications – analytics for information capture and processing to support business intelligence
- > Quantitative and qualitative methodological assessments and analysis
- > Mathematical modelling using optimisation and optimal control of operations.

Contact

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SYSTEMIC RISK, DISASTER AND RESILIENCE GROUP

The Systemic Risk and Socioeconomic Transformation team have been working on developing collaborative solutions to complex issues for over a decade. They specialise in end user-based research in which deep collaboration, systems-based approaches and communication are central. They apply the ‘inside out’ approach to develop solutions for systemic and strategic risks such as climate change, diversity and inclusion, the future workforce, and natural hazards. Their focus is the production of research solutions for complex issues, which are useful and usable for decision makers and practitioners.

They have worked nationally and internationally with stakeholders such as the International Panel on Climate Change, emergency management organisations, industry and government agencies, organisations and communities. Areas of research include climate change adaptation, climate change science, natural hazards, diversity and inclusion, resilience, and the future workforce.

Expertise

- > Policy, program development, assessment, and analysis – risk management and measurement, evidence-based strategy and governance development and decision-making analysis
- > Climate systems analysis, including regime changes and extreme events
- > Climate change impacts, adaptation, and mitigation analysis and assessment
- > Wide-ranging economic evaluations
- > Workforce and organisational assessments, including workplace culture assessment
- > Community transformation incorporating risk management
- > Systemic analysis of complex problems
- > Scenario development and analysis
- > Curation of communities of practice and fit-for-purpose workshops and knowledge-sharing forums
- > Development of decision-making support and strategic planning tools for decision makers and practitioners.

Contact

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VICTORIA ENERGY POLICY CENTRE

The Victoria Energy Policy Centre (VEPC) was established through funding from the Victorian Government. It specialises in policy-focused research in relation to renewable energy policies, with a focus on Victoria. Areas of research include economic regulation, retail energy markets, and the design of emission reduction and renewable energy policies. The VEPC has held long-standing advisory roles to governments, regulators, market participants, and interest groups in Australia and internationally.

Expertise

- > Energy economic modelling and analysis
- > Energy policy and analysis.

Contact

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VICTORIA UNIVERSITY POWER SENSING AND TELECOMMUNICATION

The Victoria University Power Sensing and Telecommunication (VUPST) group aims to pioneer the future of power systems monitoring, reliability, and protection by the research and development of innovative solutions. We work at the cutting-edge of power systems asset management and digitisation, by harnessing advancements in edge computing, IoT, signal processing, AI, and communication. Our flagship project 'SWER Broken Conductor Detection' utilises innovative approaches in PLC and edge computing for the lasting challenge of detecting broken conductors in regional areas. Currently on its third-stage of development, the group is working on bringing the developed devices to a commercial level. We are further developing capabilities to locate the conductor breakages, and monitor networks for disturbances such as high-impedance faults and other fire-igniting sources.

Expertise

- > Advanced monitoring and diagnostic solutions
- > Grid health and performance optimisation
- > Fault detection and localisation
- > Industrial power system management
- > Predictive analytics and machine learning
- > Smart grid and IoT applications
- > Smart grid integration with renewable energy sources
- > Smart disaster response technologies
- > Educational and research collaborations.

Contact

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WATER AND WASTEWATER TREATMENT RESEARCH

Our research focus aims to provide innovative and practical solutions to the management of water as a natural resource and the treatment of wastewater. We have the capability to develop and demonstrate water and wastewater treatment technologies at both the laboratory and pilot scale. These include desalination and low-pressure membrane systems, which are central to the Institute's research program.

Expertise

- > Sustainable advanced water treatment technologies
- > Membrane separations
- > Energy, and resource recovery and management
- > Social and behavioural research.

Contact

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