ANZPAA
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Policing Advisory Agency

NIFS
National Institute of Forensic Science Australia New Zealand

NATIONAL INSTITUTE OF FORENSIC SCIENCE

Research and Innovation Roadmap 2020-2025

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Promoting Research in Forensic Science

ANZPAA Strategic Priority	Research Area	
Address Risk →	Forensic Fundamentals	Strengthening underpinning science
Enhancing Practice →	Human Factors	Improving objectivity & practice
Shaping Stronger Connections →	Data Sets	Developing activity level reporting
	New Tools	Automating processes & creating new capabilities
	Forensic Intelligence	Using forensic data for broader purposes

Using this Roadmap

The purpose of the ***ANZPAA NIFS Research and Innovation Roadmap*** is to promote the investment of funding and resources in research that is operationally relevant and of vital importance to forensic science service provision in Australia and New Zealand.

The Roadmap is the result of extensive engagement with the forensic community and represents an agreed position on the priority areas for research that best promote and facilitate excellence in forensic science. It defines research areas important to strengthening current forensic science processes and building future capability.

This Roadmap is targeted at the research community and therefore aligned to the academic calendar year.

01

Research Area

Forensic Fundamentals

Empirical studies are essential to build on foundational knowledge and demonstrate the foundational validity of forensic science methodologies applied in a variety of case circumstances. Empirical studies strengthen the confidence that police, the courts, and the community have in forensic science service providers to deliver reliable results. Topics of research include:

- Understanding and developing reporting mechanisms for expressing the strength of scientific results that reflect associated limitations, uncertainty and error rates
- Providing objective evidence that testing methods are fit for purpose and the results derived can be relied upon in judicial processes
- Understanding causes and rates of error at the practitioner, method and system levels for both human-based and analytical disciplines
- Developing systems for determining the level of performance of forensic processes (e.g. double-blind system testing).

02

Research Area

Human Factors

Understanding how human interaction impacts on decisions at all levels of an investigative process is critical for safe justice outcomes. Studies in this area will inform the development of practices that reduce the impact of cognitive bias in forensic processes. Emerging technologies can improve the communication and presentation of evidence in courts. Topics of research include:

- Understanding the impact that human factors have on decision making across all practitioner types from the scene to the courtroom by exploring decision-making and knowledge in fields including medicine, engineering and the social sciences
- Developing new and innovative tools and communication pathways to fully communicate the meaning, interpretation, evaluation, and weight of scientific evidence in understandable ways to non-scientists
- Developing educational tools to promote the development and maintenance of expertise
- Develop practices to reduce exposure and impact of traumatic material and incidents on forensic examiners.

03

Research Area

Data Sets

Understanding the rarity or commonality of traces (including materials, marks, features and digital data) within a relevant population is fundamental to evaluating the source of a trace. Equally, understanding how a trace is transferred, its persistence and its prevalence in an environment is fundamental to evaluating activities that may have been responsible for the presence of the trace. Creating robust data sets strengthens the body of knowledge used to interpret findings. Topics of research include:

- Development of appropriate data sets or statistical models to support source level interpretation of analysis findings for both human-based (including fingerprints and face analysis) and analytical disciplines
- Development of appropriate data sets or statistical models to support activity level interpretation of analysis findings for both human-based and analytical disciplines
- Modelling transfer, persistence and background abundance of different trace evidence (including chemical, physical, biological, biometric and digital traces).

04

Research Area

New Tools

Recording, collecting, analysing and interpreting processes need to evolve to incorporate point of response tools and digital technologies both in the laboratory and at scenes. Advances in technology, such as Artificial Intelligence (AI), present tremendous opportunities to enhance practice by speeding-up processes and augmenting forensic science decision-making. New tools are required to reveal data embedded in emerging digital devices. Topics of research include:

- Development of new techniques to improve laboratory processes and casework outcomes
- Applying AI to support the development of automated workflows (e.g. forensic pattern recognition for fingerprint comparison, and interrogation and analysis of big data for automated intelligence)
- Development of virtual reality and augmented reality processes for scene investigation, evidence presentation and examiner training
- Application of new point of response devices for recording, collecting and analysing (including confirmatory testing) evidence at a scene for both physical and digital environments
- Evaluating (practical, technical, ethical, social and legal considerations) and implementing new technologies.

05

Research Area

Forensic Intelligence

Focus in forensic science is transitioning from the traditional stringent court reporting methods to an emphasis of support for intelligence, the outcomes of which include new investigations, disruption of crime and non-judicial pathways, such as health initiatives. Development of forensic intelligence models, effective IT management systems and standardisation of lexicon and data collection can remove roadblocks to timely analysis and exchange of forensic data. Topics of research include:

- Development of rapid reporting, collation and analysis methods for intelligence generation
- Development of consistent ontologies to better facilitate data sharing
- Devising new methods and technology to facilitate data sharing across jurisdictions.

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About ANZPAA NIFS

The National Institute of Forensic Science (NIFS) is a directorate within the Australia New Zealand Policing Advisory Agency (ANZPAA). Our strategic intent is to Promote and Facilitate Excellence in Forensic Science. Our role is to deliver support to the forensic science community in the areas of co-ordination, innovation, information management, education and training, and quality. Our program of work is underpinned by a Strategic Plan approved by the ANZPAA Board of Australia and New Zealand Police Commissioners and the Chief Police Officer of ACT Policing. The Australia New Zealand Forensic Executive Committee (ANZFEC), comprising of representatives from the government forensic service providers of our funding agencies, has oversight of the delivery of the Strategic Plan via our annual Business Plan.

About this document

Title: ANZPAA NIFS Research and Innovation Roadmap 2020-2025

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Cover Image

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