

[UNSW AI Institute](#) ([UNSW Canberra AI Hub](#)), [UNSW Defence Research Institute](#)
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in collaboration with [Defence & Security PLuS Alliance](#) and [RAND Australia](#)

The Pacific Rim Strategic Policy Conference

International Security and the Rise of Autonomous Weapons



When: 29-30 November and 1 December 2023

Where: BLD 32 LT07, University of New South Wales at Australian Defence Force Academy, Northcott Dr, Campbell ACT

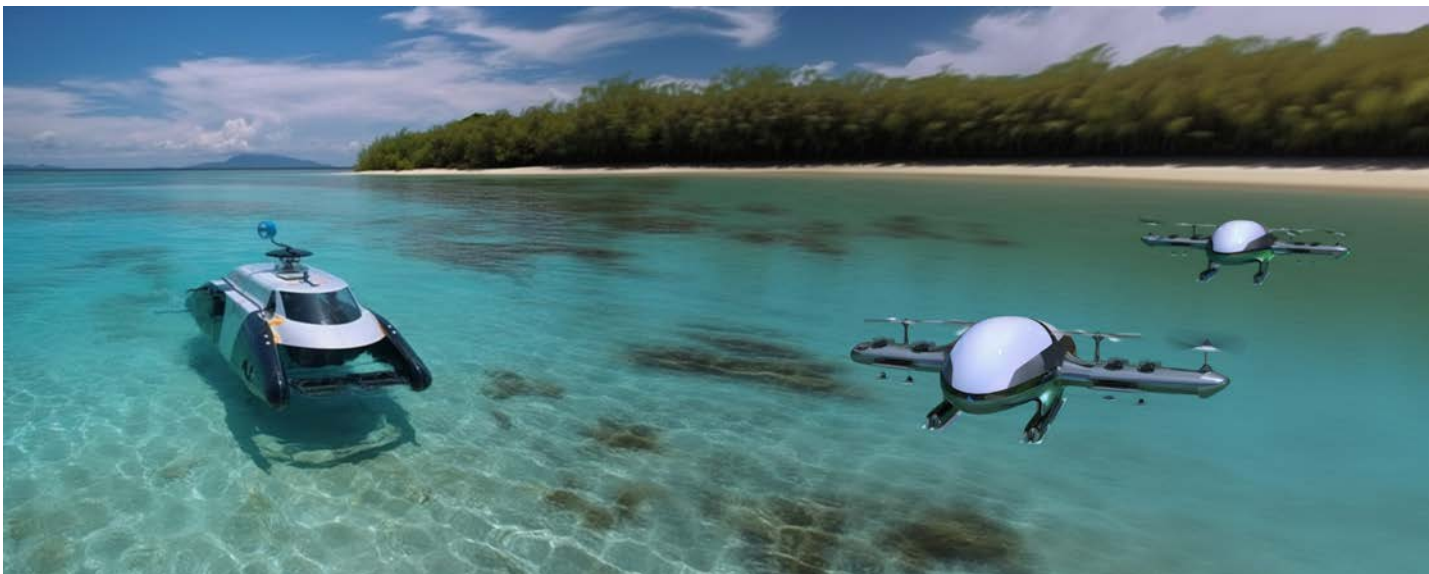
Stream the event ([Teams webinar](#)): <https://tinyurl.com/unswai291123>

Attendance is free, registration required (via Eventbrite):

<https://conference.unsw.edu.au/en/the-pacific-rim-strategic-policy-conference>

Updates: [Facebook](#) - [LinkedIn](#) - [Meetup](#)

Inquiries: m.cappuccio@unsw.edu.au



International Security and the Rise of Autonomous Weapons

Autonomous technologies (including lethal autonomous weapons, AI-based control and decision-support systems, and self-piloting/self-driving vehicles) are changing or can possibly change the composition, doctrine, and strategic posture of the military forces deployed in the Indo-Pacific. The Pacific Rim Strategic Policy Conference is concerned with the diffusion of these technologies among states, non-state, and inter-state actors and its implications for security & defence in the region. Speakers will discuss how the specificity of military cultures, innovation ecosystems, and even ethnic and religious traditions may determine different attitudes, perceptions, and expectations toward autonomous technologies, thus shaping the allied forces' capability to achieve full interoperability through technological cooperation. Comprehending cultural diversity is crucial, from a strategic policy perspective, as it impacts the degree to which technological innovation is embraced or resisted and thus determines the effectiveness of autonomous systems across strategic, operational and tactical levels.

Technology, Strategy, and Cultures in the Indo-Pacific Theatre

At a time when new security agreements and strategic technological partnerships are being signed by key regional players, the Pacific Rim Strategic Policy Conference brings together experts of international security, technology designers and developers, ethicists, and social scientists to investigate the diversity of stances toward autonomy and its strategic significance. Academics, government officers (including research and military personnel), and representatives of technological firms are invited to attend this conference and contribute presentations about:

- (A) expectations and beliefs of different groups and institutions toward AI-based applications, including the militaries participating in joint exercises and technology exchange programmes;
- (B) diverging public opinions about the ethico-legal issues associated with autonomous weapon systems in different countries and among different groups;
- (C) the diffusion of autonomous technologies and its impact on the strategic posture of national militaries, international coalitions, and non-state actors in the Indo-Pacific region.

Themes

The conference programme comprises invited lectures, submitted papers, panel discussions, and workshop activities. They will address any topics relevant to the broad theme of the conference, including, but not limited to:

- Joint exercises in the Indo-Pacific: how understanding cultural specificities could facilitate interoperability.
- AUKUS strategic partnership and other security agreements: the political significance of technological cooperation.
- Regulating or banning lethal autonomous weapons? Diverging perceptions of ethico-legal issues in different countries.
- The Security & Defence PLuS Alliance and the AUKUS partnership: academic collaborations and vision creation.
- Models of technology diffusion: the role of socio-economic, geographical, and cultural specificities.
- Attitudes and perceptions in human-autonomy interaction: the cognitive precursors of adoption propensity.
- Setting international standards to assess and validate autonomous capabilities: exploring uncharted territories.
- Soldier-robot teaming: the role played by acceptance, trust, tolerance, and anthropomorphism.
- Culturally-aware design of autonomous military technologies: lessons from social robotics, human-machine interaction, and human factors research.
- Value-sensitive design and societal acceptance: is cultural diversity a challenge or a resource?
- What causal role does culture play in conflict, if any at all? Culturalism versus Realism in security studies.
- Public trust in governments and security technology: comparing different models of social cohesion.

This conference is part of the project "Cultural Attitudes in the Age of Autonomy: Australian Policy and the Ethico-Legal Deployment of Human-Machine Teams in the Indo-Pacific" (Chief Investigator Dr Max Cappuccio), supported by the Australian Government through a grant by Defence. The views expressed herein are those of the authors and are not necessarily those of the Australian Government or Defence.





The Pacific Rim Strategic Policy Conference is convened by:

Organisers

- UNSW AI Institute (Canberra AI Hub)
- UNSW Canberra School of Engineering & Technology (Trusted Autonomy Group)
- UNSW Canberra School of Humanities & Social Sciences
- UNSW Defence Research Institute

Advisory board

- Max Cappuccio (UNSW School of Engineering & IT), chair
- Deane-Peter Baker (UNSW School of Humanities & Social Sciences)
- Matthew Garratt (UNSW AI Institute)
- Nicole Magney (Security & Defence PLS Alliance)
- James Morrison (UNSW Defence Research Institute)
- Gavin Mount (UNSW School of Humanities & Social Sciences)
- Austin Wyatt (RAND corporation)

Partners

- RAND corporation
- Security & Defence PLS Alliance

Participants

- Australian Strategic Policy Institute
- C2 Robotics
- Hanwha Defense Australia
- International Institute for Strategic Studies
- Janes
- Jericho
- Limes
- Nova Systems
- Palantir
- RICO (Australian Army, Robotic and Autonomous Systems Implementation & Coordination Office)
- Royal Australian Air Force
- Strategic Analysis Australia
- Sypaq
- UVif



Confirmed speakers and panelists

Hackyoung Bae (Korean National Defense University)
Marigold Black (Norfolk)
Srinjoy Bose (UNSW Sydney)
Benjamin Boudreaux (RAND corporation)
Max Cappuccio (UNSW Canberra)
Keith Carter (United States Military Academy at West Point)
Robert Cheek (UVify)
Nancy J. Cooke (Center for Human, Artificial Intelligence and Robot Teaming at Arizona State University)
Malcolm Davis (the Australian Strategic Policy Institute)
Richard Dunley (UNSW Canberra)
Robert C. Engen (Centre for Future Defence & National Security at Australian War College Canberra)
Toni Erskine (Coral Bell School of Asia Pacific Affairs at the Australian National University)
Mikolaj Firlej (AI Institute, University of Surrey; Oxford University)
Gavin Gillett (AIS Autonomous & Intelligent Systems, Nova Systems)
Miguel Alberto Gomez (Lee Kuan Yew School of Public Policy at the National University of Singapore)
Douglas Guilfoyle (UNSW Canberra)
Travis Ellemans (Hanwha Defence Australia)
Marcus Hellyer (Strategic Analysis Australia; C2 Robotics)
Adam Hepworth (Army's Robotic & Autonomous Systems Implementation & Coordination Office)
Amanda Holt (Sypaq)
Keirin Joyce (Royal Australian Air Force)
Mike Kelly (Palantir)
David Kilcullen (UNSW Canberra)
Jong Hwan Kim (Korea Military Academy Seoul)
Yuka Koshino (International Institute for Strategic Studies)
Andrew Lampert (Palantir)
Ian Langford (UNSW Canberra, Defence Research Institute)
Peter Layton (Griffith Asia Institute, Griffith University)
Paul Lushenko (the U.S. Army War College)
Oishee Majumdar (Janes)
Katina Michael (Arizona State University)
Gavin Mount (UNSW Canberra)
Mike Moroney (Royal Australian Air Force, Jericho)
Ann-Katrien Oimann (Royal Military Academy and KU Leuven)
Alessio Patalano (Centre for Grand Strategy, King's College London)
Carl Rhodes (Robust Policy)
Lesley Seebeck (UNSW, School of Professional Studies)
Robert Sparrow (Monash University)
Hideo Tomikawa (The National Institute of Defense Studies, Japan)
Jurriaan van Diggelen (TNO, Defence, Security and Safety, the Netherlands)
Henri van Soest (RAND Europe)

PACIFIC RIM STRATEGIC POLICY CONFERENCE

CONFERENCE SCHEDULE

FIRST DAY AFTERNOON (SESSION 1)

| Start | End | Wednesday | 29 November | Afternoon | Session 1 |
|--------|--------|----------------------|--------------------|--|--|
| 2.30pm | 5.10pm | Chair: Max Cappuccio | | AUKUS Partnership and Systems Interoperability | |
| 2.30pm | 2.40pm | Welcome | Emma Sparks | UNSW | Rector's welcome address |
| 2.40pm | 3.10pm | Keynote | Ian Langford | UNSW | The impact of robotics and other advanced technologies on the character of future conflict in the Indo-Pacific |
| 3.10pm | 3.30pm | Remote | Nancy Cooke | ASU | Human-Artificial Intelligence Teaming |
| 3.30pm | 3.50pm | Talk | Keirin Joyce | RAAF | Drone Racing's utility to contemporary operations and the next tech leap |
| 3.50pm | 4.10pm | Talk | Marigold Black | Norfolk | AUKUS as Big Science |
| 4.10pm | 4.30pm | Remote | Alessio Patalano | King's College London | Adaptation, Innovation, or Transformation? Imagining the Changing Character of War in the Indo-Pacific |
| 4.30pm | 5.10pm | Chair | Douglas Guilfoyle | UNSW | Panel 1: AUKUS Partnership and Systems Interoperability |
| | | Panel* | Elizabeth Williams | ANU | |
| | | Remote* | Henri Van Soest | RAND | |
| | | Panel | Keirin Joyce | RAAF | |
| | | Remote | Alessio Patalano | King's College London | |

SECOND DAY MORNING (SESSION 2)

| Start | End | Thursday | 30 November | Morning | Session 2 |
|---------|---------|----------------------|-----------------------|---|--|
| 9:00am | 12:40pm | Chair: Max Cappuccio | | Lethal Autonomous Weapons and Ethical Attitudes | |
| 9.00am | 9.30am | Keynote | Toby Walsh | UNSW | Lethal Autonomous Weapons: Challenges and Opportunities |
| 9.30am | 9.50am | Talk | Rob Sparrow | Monash | Minotaur Warfighting in the Indo-Pacific? |
| 9.50am | 10.10am | Talk | Jurriaan van Diggelen | TNO HART | Meaningful Human Control over Military AI: Towards Human-machine Teaming |
| 10.10am | 10.30am | Talk | Ann-Katrien Oimann | RMA KU | Navigating the Moral Landscape of Lethal Autonomous Weapons Systems: A Critical Examination of Responsibility Gaps |
| 10.30am | 10.50am | Break | | | |
| 10.50am | 11.20am | Keynote | Toni Erskine | ANU | Machines Masquerading a Moral Agents: the Danger of Misplaced Responsibility in War |
| 11.20am | 11.40am | Talk | Srinjoy Bose | UNSW | Target Discrimination: How Racial Biases Affect Public Support for U.S. Drone Strikes |
| 11.40am | 12.00pm | Remote | Paul Lushenko | USAWC | Battlefield Trust for Human-Machine Teaming: Evidence from the US Military |
| 12.00pm | 12.40pm | Chair | Deane Peter Baker | UNSW | Panel 2: Lethal Autonomous Weapons and Ethical Attitudes |
| | | Panel | Jurriaan van Diggelen | TNO HART | |
| | | Panel | Ann-Katrien Oimann | RMA KU | |
| | | Panel | Srinjoy Bose | UNSW | |
| | | Remote | Paul Lushenko | USAWC | |

SECOND DAY AFTERNOON (SESSION 3)

| Start | End | Thursday | 30 November | Afternoon | Session 3 |
|--------|--------|--------------------|-----------------|--|---|
| 2.00pm | 5.40pm | Chair: Gavin Mount | | Asymmetric Warfare and Technology gaps | |
| 2.00pm | 2.30pm | Keynote | Jong Hwan Kim | Korea Military Academy Seoul | AI driven Autonomous Targeting Process for Minimizing Collateral Damages |
| 2.30pm | 2.50pm | Talk | Adam Hepworth | RICO | Capability Offsets: Exploring the Promised Opportunity of Emerging Technology |
| 2.50pm | 3.10pm | Talk | Austin Wyatt | RAND Australia | Generating and maintaining asymmetric advantage through RAS-AI: Opportunities and Barriers |
| 3.10pm | 3.30pm | Talk | Amanda Holt | Sypaq Australia | The Precision Payload Delivery Systems (PPDS) – aka the Cardboard Done |
| 3.30pm | 3.50pm | Break | | | |
| 3.50pm | 4.20pm | Keynote | Oishee Majumdar | Janes | Future of loitering munitions in the Asia-Pacific |
| 4.20pm | 4.40pm | Talk | Carl Rhodes | Robust Policy | Fly or die: The rapid advance of UAS technology and operating concepts in the Russia-Ukraine conflict |
| 4.40pm | 5.00pm | Remote | Miguel Gomez | NUS | Emotions, Culture, and Geopolitics: the AI Strategies of Emerging Powers |
| 5.00pm | 5.40pm | Chair | Austin Wyatt | RAND Australia | Panel 3: Asymmetric Warfare and Technology gaps |
| | | Panel* | Marcus Hellyer | C2 Robotics | |
| | | Remote* | David Kilcullen | UNSW | |
| | | Panel | Adam Hepworth | RICO | |
| | | Panel | Amanda Holt | Sypaq | |
| | | Remote | Miguel Gomez | NUS | |

THIRD DAY MORNING (SESSION 4)

| Start | End | Friday | 1 December | Morning | Session 4 |
|---------|---------|---------------------|-----------------|------------------------------------|---|
| 9:00am | 12:40pm | Chair: Austin Wyatt | | | Strategic Postures after the Rise of Autonomy |
| 9.00am | 9.30am | Keynote | Yuka Koshino | IISP | Japan's approaches to military applications of autonomous technologies |
| 9.30am | 9.50am | Remote | Mikolaj Firlej | Oxford | How autonomous weapon systems are changing the doctrine and role of military teams? |
| 9.50am | 10.10am | Talk | Malcolm Davis | ASPI | Space and Autonomy - the importance of the high frontier in the robotic battlespace and Australia's future in space |
| 10.10am | 10.30am | Talk | Katina Michael | ASU | DARPA's ADvanced Acclimation and Protection Tool for Environmental Readiness (ADAPTER) |
| 10.30am | 10.50am | Break | | | |
| 10.50am | 11.20am | Keynote | Hackyoung Bae | Korean National Defense University | South Korea Indo-Pacific strategy and maritime security |
| 11.20am | 11.40am | Talk | Robert Engen | Deakin | When the Teeth Eat the Tail: The Past and Present of Defence A.I. in Canada |
| 11.40am | 12.00pm | Talk | Gavin Gillett | Nova Systems | Enhancing Soldier-Robot Teaming Through Soft Programming, Platooning and Strategic Deployment |
| 12.00pm | 12.40pm | Chair: | Malcolm Davis | ASPI | Panel 4: Strategic Postures after the Rise of Autonomy |
| | | Panel* | Travis Ellemans | Hanwha Australia | |
| | | Panel* | Peter Layton | Griffith | |
| | | Panel | Gavin Gillett | Nova Systems | |
| | | Panel | Katina Michael | ASU | |
| | | Remote | Mikolaj Firlej | Oxford | |

THIRD DAY AFTERNOON (SESSION 5)

| Start | End | Friday | 1 December | Afternoon | Session 5 |
|--------|--------|--------------------------|--------------------|--|--|
| 2:00pm | 5:30pm | Chair: Douglas Guilfoyle | | Policy and Governance of AI and Data | |
| 2.00pm | 2.30pm | Keynote | Mike Kelly | Palantir | Algorithmic Warfare, AI, and Achieving the Asymmetric Outcome |
| 2.30pm | 2.50pm | Talk | Lesley Seebeck | UNSW | AUKUS and the challenge of time |
| 2.50pm | 3.10pm | Talk | Marcus Hellyer | SAA | The Strategic Drivers for Autonomous Weapons in the Indo-Pacific |
| 3.10pm | 3.30pm | Talk | Gavin Mount | UNSW | Disinformation Bots and the Indo-Pacific |
| 3.30pm | 3.50pm | Break | | | |
| 3.50pm | 4.10pm | Talk | Peter Layton | Griffith | Thinking Conflict, Competition and Cooperation: Using Cognition as an Organising Construct |
| 4.10pm | 4.30pm | Talk | Richard Dunley | UNSW | “Small mobile pieces of national sovereignty”? Uncrewed vessels, naval diplomacy and the challenge of signalling |
| 4.30pm | 4.50pm | Remote | Hideo Tomikawa | National Institute for Defense Studies | The Impact of Robotics, Autonomous Systems & AI (RAS-AI) on the Global Security |
| 4.50pm | 5.30pm | Chair: | Gavin Mount | UNSW | Panel 5: Policy and Governance of AI and Data |
| | | Panel* | Mike Moroney | RAAF | |
| | | Panel* | Andrew Lampert | Palantir | |
| | | Remote* | Benjamin Boudreaux | RAND Corporation | |
| | | Panel | Lesley Seebeck | UNSW | |
| | | Panel | Rob Sparrow | Monash | |
| | | Remote | Hideo Tomikawa | National Institute for Defense Studies | |

PACIFIC RIM STRATEGIC POLICY CONFERENCE
International Security and the Rise of Autonomous Weapons

UNSW Canberra, 29-30 November and 1 December 2023

BOOK OF ABSTRACTS (last update: 27 November 2023)

South Korea Indo-Pacific strategy and maritime security

Hackyoung Bae (Graduate School of National Security, Korean National Defense University)

As its name suggests, the Indo-Pacific Strategy is a geostrategy centered on the Indo-Pacific (Ocean). However, many of the scholars that have studied the U.S. Indo-Pacific strategy on the subject of the U.S.-China competition so far deal with international relations and domestic politics of the U.S. and China. The start of the geo-strategy must start from the importance of the region and strategic values to derive a proper strategy, but the importance of the Indo-Pacific itself has been overlooked as it is handled at the international political level. This paper defines the Indo-Pacific Strategy as a geostrategy and analyzes the strategic value of the region from the maritime perspective. The importance of the Indo-Pacific Ocean was presented from the marine perspective of population, regional economic blocks, maritime jurisdiction, deep-sea resources, and crude oil transport routes. The United States is making various efforts to implement three lines of effort (Preparance, Partnership, Promoting a Networked Region) centered on the Indo-Pacific Command. This Indo-Pacific is also important to us. Due to Korea's industrial structure, it relies heavily on imports of raw materials and exports of final products through the sea. Therefore, the maritime transportation route itself is very important. In addition, the Indo-Pacific region is very important to secure a wider marine territory in the absence of a agreement on maritime delimitation line with neighboring countries. Considering the U.S.-China conflict, the U.S. Indo-Pacific strategy and military activities, and the importance of the U.S.-China competition to us, it is necessary to consider how Korea can choose various policy options to maximize national interest in the future.



Prof Hackyoung Bae obtained a PhD in International Relations from Florida State University, a Master's degree in International Relations from the Korea National Defense University, and a Bachelor's degree in Electrical Engineering from the Naval Academy. Currently, he is serving as the Director of Center for Military Strategy Study at the Research Institute for National Security Affairs. He is also an part time graduate program director (night and weekend) in the Department of Military Strategy. Additionally, he is an advisory member of the Chungcheongnam-do Marine Space Utilization Committee and a member of the Future Marine Warfare Center at the Naval Headquarters. His major publications include "Marine Space Power in the Age of Space Battlefield"(in Korean), "Marine Security and International Relations in the 21st Century"(in

Korean), and the English publication "War and conflict Management between the two Koreas". He has also published various papers in academic journals, including "The Ukraine War and Future Warfare: Implications for the Indo-Pacific Region and the Korean Peninsula"(in Korean), "Marine-based Mobile Tri-axis System"(in Korean), "Operational Concept and Power Development Direction of the Korean Ghost Fleet (Unmanned Remote Fleet)"(in Korean), and "Development Direction of Marine-based National Defense Space Power for Space Situation Awareness" (in Korean).

AUKUS as Big Science

Marigold Black (Norfolk)

Big Science, as an instrument of The Manhattan Project, produced the first nuclear weapons. But it was consequential in ways beyond the creation of the bomb. Big Science produced new levels of security, generated novel collaborative structures and communities, engendered cross disciplinary debates around the role of science and technology in national pursuits, and created a grandiose conceptual landscape for epistemic discovery. While never far from controversy, Big Science was driven by a higher power, that is, the quest for purposeful knowledge. And lots of it. What if AUKUS was conceived as Big Science? What if it was conceived, not merely as security architecture, but as a bastion of knowledge and discovery? This is not as crazy as it sounds.

The large-scale collaborative structures inherent to Pillar 2 of AUKUS could be poised for major epistemic discovery if used astutely and resourcefully. AUKUS is Big Science, even if it was not initially framed that way. The intended purpose of Pillar 2 is to enhance cyber capabilities, artificial intelligence, quantum technologies, undersea capabilities, hypersonics, electronic warfare, and information sharing, thereby contributing to uplift in the science, technology, and industrial networks of three countries. But so far, Pillar 2 has not been directed to best effect, despite growing recognition of its considerable potential. This paper will explore what it would mean if AUKUS members were to proudly, purposefully, and resolutely advance RAS-AI research as a collaborative epistemic endeavour, using Big Science constructs and concepts to deliver excellence in the field. It will look specifically at how AUKUS, framed as a multinational quest for discovery rather than a security pact made sensible by deterrence logics, could be a political boon, both diplomatically and domestically. AUKUS, as a champion of excellence in the field of RAS-AI would assume a high-minded and future-focused mandate, which could potentially smooth domestic tensions as well as strengthen international ties, and rouse support from countries lacking the resources to pursue similar initiatives and wanting to share in the spoils.



Dr Marigold Black is the Director of Norfolk. She was previously a Researcher at RAND Australia, a Research Fellow at the Australian Army Research Centre and the Strategic and Defence Studies Centre, and a Postdoctoral Fellow at the Laureate Research Program in International history at the University of Sydney. She has expertise in conceptions of sovereignty in historical and contemporary perspective, the origins of international law and global orders, and has conducted diverse research on Defence and national security issues. Dr Black trained as an intellectual historian and is a passionate advocate for historical consciousness in policy relevant contexts.

Target Discrimination: How Racial Biases Affect Public Support for U.S. Drone Strikes

Srinjoy Bose (University of New South Wales Sydney), Keith Carter (United States Military Academy at West Point), Paul Lushenko (United States Army War College)

Despite strong public support, critics claim that U.S. drone strikes are racially biased. Yet there is no empirical evidence that these operations are systematically racialized. We field an image-based survey experiment among U.S. citizens to empirically assess the relationship between race and public support for U.S. drone strikes. Our study isolates the causal effect of two mechanisms that scholars argue shape racial preferences for strikes, including the skin colour and location of a target. We find little evidence that U.S. citizens calibrate their support for strikes along these lines. Rather, our results show that respondents with racist worldviews are more likely to support drone strikes regardless of a target's skin colour and location, and that providing more detail on the target can decrease public support. Our findings suggest that the way officials frame U.S. drone strikes has more important implications for public support than do implicit racist attitudes.

Dr Srinjoy Bose is a Senior Lecturer in Politics and International Relations at University of New South Wales Sydney. He researches topics in critical peace/security studies including, political order and violence, international intervention, state (trans)formation, democratisation, warlord/rebel governance, and the political economy of statebuilding and peacebuilding in 'fragile' and deeply divided states and societies. His research has been funded by the European Union, UN Development Programme and UN Office for the Coordination of Humanitarian Affairs, United States Institute of Peace, Australian Aid, and even Facebook. His research is applied and outcome oriented, and has contributed to significant transformative and positive change in South / Southwest Asia and beyond. For example, his research on democracy promotion informed the Independent Elections Commission of Afghanistan's election reform efforts. Similarly, his research on state-building informed the United Nations Development Programme's reconstruction efforts in Mosul, Iraq.



LTC Keith Carter, PhD is a United States Army officer currently stationed at the United States Military Academy at West Point, where he serves as the Director of the Defense and Strategic Studies Program. Keith's last operational assignment was at Fort Bragg where he served as a strategic planner in the Joint Special Operations Command. Prior to that Keith Commanded 1-26 IN at Fort Campbell, Kentucky. Over the course of his career, Keith has served in a variety of infantry formations including the 101st ABN DIV, the 2nd Infantry Division, the 75th Ranger Regiment, and the 4th Infantry Division. Keith earned his Doctorate in Political Science from the University of Pennsylvania; his research interests include technology and strategy, civil-military relations, the role of arms trades in alliance formation, and information age war.

LTC Paul Lushenko, PhD is a Lieutenant Colonel in the U.S. Army and Director of Special Operations at the U.S. Army War College, where he also teaches. He commissioned as a Military

Intelligence Officer in 2005 following graduation from the United States Military Academy as a Distinguished Honor Graduate. He won a Rotary Ambassadorial Scholarship and studied at The Australian National University from 2010-2012, where he received a Master of Arts in International Relations and a Master of Diplomacy. He then earned a Master of Defense and Strategic Studies from the U.S. Naval War College in 2016, graduating #1 in his class. Paul is also a Council on Foreign Relations Term Member, Adjunct Research Lecturer for the Australian Graduate School of Policing and Security at Charles Sturt University, and Non-Resident Senior Fellow at the Cornell University Brooks School Tech Policy Institute. He is the co-editor of *Drones and Global Order: Implications of Remote Warfare for International Society* (Routledge 2022), which is the first book to systematically study the implications of drone warfare on global politics. He has written and lectured widely on drone warfare, irregular warfare, and regional security order-building, and his current research focuses on evolving patterns of drone warfare globally and public perceptions of legitimate strikes. Paul's second book, *The Legitimacy of Drone Warfare: Evaluating Public Perceptions* (Routledge), is forthcoming.



Unpacking the Swarm: An Insightful Exploration of Drone Technology in the Indo-Pacific from UVify's Perspective

Robert Cheek (UVify)

The evolution of swarm drone technologies marks a pivotal juncture in the trajectory of modern warfare and security operations. This talk, presented from the vantage point of UVify – a participant in the drone industry – aims to dissect the intricacies and potential of these advanced systems, with the geostrategically vital Indo-Pacific region serving as our analytical backdrop. Interoperability, a cornerstone for the successful deployment of swarm drones, is an essential aspect to consider, particularly within the cultural melting pot that characterizes the Indo-Pacific. Our analysis will delve into how a keen understanding and appreciation of cultural divergences can lead to harmonious integration of disparate military forces, thereby enhancing the efficacy of swarm drone operations. Moreover, we will scrutinize the role of pivotal partnerships and alliances, such as AUKUS, in propelling the development and integration of swarm drone technologies. Venturing into the ethical landscape, this talk will address the formidable challenges and queries that swarm drones pose. Who holds accountability in the complex web of autonomous decision-making characteristic of swarm drones? How do these technologies intersect with the principles of international law and human rights? These are some of the pressing questions that will be explored, with insights drawn from panel discussions and a thorough examination of the legal and ethical dimensions at play. The academic and research communities are instrumental in charting the course for the future of swarm drone technologies. Through this talk, we will highlight the vital contributions of academic collaborations and research initiatives, leveraging lessons gleaned from social robotics, human-machine interaction, and human factors research. A particular focus will be placed on the culturally-aware design of swarm drone systems, elucidating how value-sensitive design and societal acceptance can be achieved in the face of cultural diversity. Furthermore, the talk will explore the pivotal role of public trust in government and security technology. By drawing parallels across diverse models of social cohesion, we will illuminate how societal attitudes and perceptions shape the acceptance and integration of swarm drone technologies. This talk, presented from the unique perspective of UVify – a stakeholder in the drone industry – seeks to offer a multi-dimensional

analysis of the complexities and potentialities associated with the adoption and regulation of swarm drone technologies in the Indo-Pacific. By delving deep into the technological, ethical, and cultural facets that shape these advanced systems, we aspire to contribute to the ongoing discourse and foster informed decision-making in this rapidly evolving field.



Robert Cheek is the Chief Operating Officer at UVify, a manufacturer specializing in aerial robotics. Its product line includes IFO, the IFO-S open research platform for swarm application developers, OMEGA, an open modular environment for general autonomy, and SLAMDAQ, a SLAM data acquisition device. Prior to his appointment as COO of UVify, Cheek served as the senior robotics analyst for the investment banking division of the Hyundai Motor Group. He identified and analyzed robotics companies and technologies, including engagements with firms such as Boston Dynamics. He provided guidance on potential investments or partnerships and acted as an advisor to robotics firms in the United States, South Korea, and Germany. Cheek also served as the Director of Business Development for Yujin Robot's Innovation Lab, leading the GoCart project, one of the world's first Autonomous Mobile Robots (AMRs). In addition to robotics, Cheek worked on technology investments for the Sapinda Group. He worked with Fyber, a digital media company traded on the DAX, during their IPO, and Azubu, an eSports broadcaster and content developer, organizing the inaugural League of Legends Champions live eSports event in Seoul in 2012. Cheek has published numerous papers on robotics for investors and contributed articles to media outlets. He has collaborated with TED regular Derek Sivers and frequently speaks at media events across the US, Asia, the MENA region, and Europe. Cheek holds an MBA from the Helsinki School of Economics and a BA from the University of Florida. He also studied at St Catharine's College at Cambridge University and Stanford University.

Human-Artificial Intelligence Teaming

Nancy J. Cooke (Center for Human, Artificial Intelligence and Robot Teaming at Arizona State University)

The future of work will require technology to work closely with humans in a teaming relationship in which the AI (Artificial Intelligence) does what it does best, and humans take on complementary roles doing what they do best in an interdependent fashion. Effective human-AI teaming requires best practices in human-systems integration including appropriate team composition and role assignment, designing effective human-AI team processes, team development or training, and effective team measurement.



Dr Nancy J. Cooke is a professor of Human Systems Engineering at Arizona State University and directs ASU's Center for Human, Artificial Intelligence, and Robot Teaming. She received her PhD in Cognitive Psychology from New Mexico State University in 1987. Dr. Cooke's research interests include the study of individual and team cognition and its application to human, AI, and robot teaming, manned

unmanned teaming, and empirical assessments of teams and teamwork. Dr. Cooke specializes in the development, application, and evaluation of methodologies to elicit and assess individual and team cognition. Her work is funded primarily by DoD.

Space and Autonomy - the importance of the high frontier in the robotic battlespace and Australia's future in space

Malcolm Davis (the Australian Strategic Policy Institute)

The growing role of autonomous systems, including the emerging role of lethal autonomous systems, is a clear step change in the nature of future warfare. The ability to mass produce, at potentially low cost, large numbers of autonomous systems for sensing, intelligence gathering, and strike roles, opens up new approaches to the application force, and the ability to leverage mass on the battlespace. But although AI may allow some autonomous systems to operate independently, for western liberal democracies at least, humans will need to be on the loop to provide oversight of the use of autonomous systems. In this regard, the ability to maintain resilient command and control is vital and the role of space capabilities is of critical importance. This paper explores how the space domain will become increasingly vital to support the use of swarming autonomous systems in the air, on and over land, and on and under the sea, in a way that demands resilient space capability and assured responsive access to space. Space is a contested operational domain, and sustaining space control will be vital for success on terrestrial battlefields. The ability of an adversary to disrupt command and control of large numbers of autonomous systems by attacking space capabilities could quickly erode western military effectiveness. In this sense, air, sea and land campaigns exploiting large numbers of autonomous systems will demand a 'space campaign' and space capabilities to match. This paper explores what Australia will need to develop in terms of resilient space systems, and assured responsive space access to fully support the exploitation of large numbers of autonomous systems in the future battlefield, and consider potential change to Australian defence and national space policy to meet operational goals.



Dr Malcolm Davis, joined ASPI as a Senior Analyst in Defence Strategy and Capability in January 2016. Prior to this he was a Post-Doctoral Research Fellow in China-Western Relations with the Faculty of Society and Design at Bond University from March 2012 to January 2016, and he currently retains an Honorary Assistant Professor position in the Faculty. He has worked with the Department of Defence, both in Navy Headquarters in the Strategy and Force Structure area, and with Strategic Policy Division in the Strategic Policy Guidance and Strategic External Relations and Education sections from November 2007 to March 2012. Prior to this appointment he was a Lecturer in Defence Studies with Kings College London at the Joint Services Command and Staff College, in Shrivenham, UK, from June 2000 to October 2007. He holds a PhD in Strategic Studies from the University of Hull as well as two Masters degrees in Strategic Studies, including from the Australian National University's Strategic and Defence Studies Centre. His main research focus is on defence strategy and capability development, military technology, and the future of warfare.

“Small mobile pieces of national sovereignty”? Uncrewed vessels, naval diplomacy and the challenge of signalling

Richard Dunley (University of New South Wales Canberra)

Uncrewed vessels are set to play a significant role in naval operations in the near future. This paper considers the implications of this shift on naval diplomacy and signalling operations. It argues that uncrewed vessels will not have the same status and symbolic power that crewed warships currently have, and this will limit their ability to conduct signalling operations. The shift to uncrewed vessels will also increase uncertainty within naval diplomatic exchanges and will potentially heighten the risks involved in such activity.



Dr Richard Dunley is a Senior Lecturer in history in the School of Humanities and Social Sciences (HASS), UNSW Canberra. Research Interests. Previously, he was a Principal Records Specialist at the National Archives, UK. His previous publications examine British defence, strategic and foreign policy in the late nineteenth and early twentieth centuries.

When the Teeth Eat the Tail: The Past and Present of Defence A.I. in Canada

Robert C. Engen (Deakin University’s Centre for Future Defence & National Security at Australian War College Canberra)



Canada is in trouble when it comes to defence artificial intelligence (AI). Although the country is well- placed globally for AI research, development, and funding, its Department of National Defence/ Canadian Armed Forces (DND/CAF) are badly positioned to embrace digital transformation – including artificial intelligence systems. This is a consequence of the organization’s structure, its history, and its culture rather than any technical shortcomings. The consistent privileging of operations and the “teeth” of the organization and the denigration of its “tail” support functions has meant that DND/CAF information management system has been a disaster for more than two decades. Both internal and external agencies have recently flagged critical shortcomings in information management, procurement, personnel, and professionalism in DND/CAF as major roadblocks to wide- scale implementation of defence AI. A comprehensive DND/CAF *Artificial Intelligence Strategy* exists in draft form, and there are many Canadian initiatives related to defence AI under development. DND/CAF has solid mechanisms for funding and nurturing AI projects in partnership with academia and industry. But most of these initiatives must be small in scale to circumvent the larger, highly dysfunctional defence procurement process in Canada. The decentralized organizational siloes mean that AI development, funding, and operation happen in isolation and without horizontal connections to the rest of the organization. There are also serious unanswered questions about how AI will be governed within DND/CAF. Defence AI systems are finding limited operational and business application in the Canadian military establishment. However, present existential issues related to procurement and personnel are likely to throw these efforts into disarray or ensure disappointing results. Short of major structural and

cultural change within DND/CAF, it seems extremely unlikely that Canada will be able to make meaningful steps towards largescale implementation of defence AI this decade.

Dr Robert C. Engen is Senior Lecturer in War Studies at Deakin University’s Centre for Future Defence and National Security, attached to the Australian War College in Canberra. He has previously taught at the Canadian Forces College and the Royal Military College of Canada. He is an historian by training and is the author of four books on the human dimension of warfare. Lately his research profile has expanded to include the “inhuman” dimensions of artificial intelligence at war. He teaches professional military education courses on contemporary trends in modern warfare, cyber and information warfare, and wargaming for design and analysis.

Machines Masquerading a Moral Agents: AI, Automated Systems, and the Danger of Misplaced Responsibility in War

Toni Erskine (Coral Bell School of Asia Pacific Affairs at the Australian National University)

How we (as citizens, soldiers, and states) perceive – and misperceive – intelligent machines matters profoundly. In this lecture, Professor Toni Erskine will draw on particular examples of our interactions with intelligent machines – whether algorithmic systems or intelligent machines – to demonstrate that how we interpret their capacities and vulnerabilities informs our assumptions about their moral status. In particular, she will maintain that our conjectures about the capacities of intelligent artefacts affects our attributions of moral responsibility for the acts and outcomes with which they are associated. One highly consequential context for this is our increasing reliance on AI-enabled weapons and decision-support systems in war. Specifically, Professor Erskine will argue that the ways in which individual and institutional actors misunderstand the moral status of such artefacts risks leading to potentially disastrous instances of misplaced responsibility. After addressing psychological (and cultural) factors that influence our interactions with these entities, and contribute to these misperceptions, she will conclude by proposing ways that this risk of misplaced responsibility in war might be mitigated.



Toni Erskine is Professor of International Politics in the Coral Bell School of Asia Pacific Affairs at the Australian National University (ANU) and Associate Fellow of the Leverhulme Centre for the Future of Intelligence at Cambridge University. She is also Chief Investigator of the Defence-funded ‘Anticipating the Future of War: AI, Automated Systems, and Resort-to-Force Decision Making’ Research Project and a Founding Member and Chief Investigator of the ‘Humanising Machine Intelligence’ Grand Challenge at ANU. She serves as Academic Lead for the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP)/Association of Pacific Rim Universities (APRU) ‘AI for the Social Good’ Research Project and in this capacity works closely with government departments in Thailand and Bangladesh. Her research interests include the impact of new technologies (particularly AI) on organised violence; the moral agency and responsibility of formal organisations in world politics; the ethics of war; the responsibility to protect vulnerable populations from mass atrocity crimes (‘R2P’); and the role of joint purposive action and informal coalitions in response to global crises. She is

currently completing a book entitled *Locating Responsibility: Institutional Moral Agency in a World of Existential Threats* and is the recipient of the International Studies Association’s 2024 International Ethics Distinguished Scholar Award.

How autonomous weapon systems are changing doctrine and the role of military teams?

Mikolaj Firlej (AI Institute, University of Surrey)

The use of autonomous weapon systems (AWS), contrary to what the name suggests, has become a complex socio-technical system that requires trust and integration of human and automation factors. My presentation explores how the growing use of autonomy in weapon systems has affected both key tenets of the US Air Force (USAF) military doctrine as well as more specific rules within the US Department of Defense (US DoD) regarding the role of military personnel. USAF doctrine has long been guided by the tenet of centralized control according to which military control belongs to a mission commander, but I argue that this tenet was not fit for purpose for various air domain missions, including close-air support with a dynamic targeting. I, therefore, argue that the recent change from centralized to distributed control was, in fact, deeply rooted in the wider and increasingly more strategic use of autonomy in weapon systems. Further, I also present how the growing use of autonomy led to this year’s updates of the US DoD) Directive 3000.09 on the use of autonomy in weapon systems. I argue that this update was a move in the right direction since it finally addressed the use of artificial intelligence (AI) in AWS and provided for a more detailed review process before fielding and deploying such weapons. I argue, however, that the potential adoption of large language models (LLMs), specifically transformers, introduces new threats to end users of AI-enabled AWS and thus further changes in the Directive are required. It is my expectation that the presentation, enriched from data from US and Allied countries, will contribute to the topic of how autonomous technologies are changing doctrine, and the role of military forces, in the Indo-Pacific.



Dr Mikolaj Firlej is a Lecturer (Assistant Professor) at the AI Institute at the University of Surrey and Director of Law and Technology Hub. His research concentrates on ethical and legal issues associated with the development and use of autonomous systems as well as the application of machine learning in defense and intelligence sectors. Previously, at Oxford, Mikolaj helped to establish the Centre for Technology and Global Affairs at the Department for Politics and International Relations, where he coordinated development activities and supported the AI research Programme as a Research Affiliate. He holds a doctorate from the Faculty of Law, University of Oxford awarded for a thesis on the emerging regulatory standards over the use of AI-

augmented and autonomous weapon systems in the US Air Force. He also graduated from the MPP at the Oxford School of Government and did both graduate and undergraduate studies in socio-legal studies and philosophy at Oxford and the Inter-Faculty Individual Studies in the Humanities, University of Warsaw. Mikolaj is also a co-founder and general partner of Expeditions Fund, a private investment firm.

Enhancing Soldier-Robot Teaming Through Soft Programming, Platooning and Strategic Deployment

Gavin Gillett (AIS Autonomous & Intelligent Systems, Nova Systems)

In the rapidly evolving landscape of modern warfare, soldier-robot teaming represents a significant paradigm shift in military operations. Drawing parallels from the mining and metals industry, this paper highlights the relevance of technologies and methodologies being utilised therein, which hold potential applications for enhancing the synergy between soldiers and robots. The methodology employed here stems from direct experience in crafting digital strategy and implementing hardware solutions in the mining sector. By adapting this experiential data to an academic framework, insights were gleaned on optimal strategies for integrating robots into military roles in a way humans are willing to accept and adopt. One of the standout findings from this study is the promising nature of "soft programming" approaches. These approaches allow robots to mimic and follow the lead of human actors, enabling quick establishment of logistical chains and facilitating various battlefield operations, including the construction of barriers, suppression tactics, and strategic manoeuvring. Early indicators suggest that such soft programming strategies are not only efficient but also hold potential for large-scale deployment. Furthermore, as technology progresses, it's anticipated that with minimal human intervention ("human-in-the-loop" actors), robotic entities will progressively dominate critical logistics and battlefield-shaping roles. This transition bears profound implications for global military strategies. Nations that possess advanced technological infrastructure, abundant resources, strong manufacturing capabilities, yet have smaller populations, stand to benefit immensely. Soldier-robot teaming can serve as a significant force multiplier for these nations, revolutionising their military supply chain management and enhancing force projection capabilities. In conclusion, as we delve deeper into the age of automation and robotics, the lessons from the mining and metals industry offer valuable insights. Adopting and adapting these lessons for the military can pave the way for more efficient, effective, and scalable soldier-robot partnerships, reshaping the future dynamics of warfare for Australia.



Gavin Gillett's career spans over two decades in the metals and mining industry. Gavin is a pioneer in operational innovation and strategic development. He has held pivotal roles in Rio Tinto, including representing the company on the American Chamber of Commerce National Space Committee, and as a founding member of key steering committees in remote operations and sensing. As well as being part of the team that established the non-profit organisation AROSE to leverage existing remote operations expertise in the Australian resource sector and catalyse knowledge transfer between terrestrial and off-earth domains. Gavin's contributions at Rio Tinto have focused on forward-thinking strategies and practical solutions. Year 2022 involved in the End-to-End Digital Transformation Program, a significant project valued at \$370M, which marked a substantial investment in implementing the envisioned strategies. In 2023, Gavin embarked on a new venture with Nova Systems, diving deep into the world of Systems Engineering. Here, he continues to make strides in Autonomous and Intelligent Systems design, contributing to projects across defence, government, and special missions.

Emotions, Culture, and Geopolitics: An Investigation into the AI Strategies of Emerging Powers

Miguel Alberto Gomez (Lee Kuan Yew School of Public Policy at the National University of Singapore)

Advancements in artificial intelligence (AI) prompt political and military leaders to argue that these technologies facilitate a shift in the balance of power within the international system (Ayoub & Payne, 2016). Nevertheless, the potential use of AI-enabled systems prompts concerns over destabilization and escalation (Horowitz, 2019; Johnson, 2020). The literature, however, tempers hyperbolic claims of the benefits and threats surrounding AI. Scholars such as Horowitz (2018) note that, like previous technological developments (e.g., airpower during the Second World War), AI should be treated as enablers whose benefits are contingent on the manner of their employment. Relatedly, others such as Jensen, Whyte, and Cuomo (2020) point to the interaction between cognitive and bureaucratic processes that determine the adoption of these technologies into existing processes. Finally, scholars such as Roff and Danks (2018) assert that trust moderates the adoption of novel technologies. While these and related endeavors ground expectations, the literature does not provide a definitive framework linking these disparate concepts. Furthermore, it remains silent on how preferences and perceptions form among elites and non-elites and how these interact to influence strategy. Owing to its dual-use nature (Horowitz, 2019) and depictions in popular media (Young & Carpenter, 2018), it is crucial to shed light on the mechanisms that encourage artificial intelligence adoption and strategic use. These considerations are particularly salient when considering states' growing interest in such technologies in strategically sensitive regions such as the Indo-Pacific. Specifically, small and medium powers view these technologies as providing an advantage over materially endowed adversaries. With these points in mind, this project asks *how and why small and middle powers consider the strategic use of artificial intelligence?* To answer this question, the project adopts a framework that surfaces the role of emotions, (strategic) culture, and structural conditions in shaping AI adoption among small to medium powers. In doing so, the project utilizes a holistic approach that looks at the micro-, meso-, and macro-level factors that explain how states perceive AI as a means of achieving their strategic objectives. As a plausibility probe, I present the case of the Philippines to demonstrate the feasibility of this framework.



Dr Miguel Alberto Gomez has been a Senior Researcher with the Center for Security Studies at the Swiss Federal Institute of Technology (ETH) since 2016 and is an incoming (Dec 2023) Senior Research Fellow at the Lee Kuan Yew School of Public Policy (at the National University of Singapore (LKYSPP-NUS)). His research is found at the intersection of technology, foreign policy, and political psychology, focusing on public opinion and elite decision-making. He received his doctoral degree in political science from the University of Hildesheim and his bachelor's degree in computer science from De La Salle University.

The Strategic Drivers for Autonomous Weapons in the Indo-Pacific

Marcus Hellyer (Strategic Analysis Australia; C2 Robotics)

Advocates of autonomous military systems have proclaimed their benefits for many years, however until recently they have had limited operational use, primarily in the air domain. This situation is now rapidly changing. Autonomous maritime systems, previously in the too hard basket, are now being deployed in the Indo-Pacific. Certainly advances in technology are enabling this. These included advances in autonomy but also in range, endurance and reliability which are breaking autonomous systems' earlier dependence on motherships. But there are many other strategic drivers for the accelerating uptake of autonomous military systems in the region. One is the cost-capability death spiral of exquisitely complex crewed platforms that make them too slow to design and build and too expensive to be acquired in numbers. Related to this is the growing size of the PLAN, now larger than the USN. Autonomous systems offer the potential to deliver affordable mass to western navies. Moreover, by physically disaggregating capabilities, uncrewed systems can be significantly simpler than traditional platforms, allowing faster development cycles. Also, militaries have now progressed further down the path of developing operating concepts that can successfully employ uncrewed systems as part of 'mosaic' and distributed warfare concepts. This has required new thinking and new cultures but has moved militaries beyond frameworks that saw uncrewed systems simply as poor replacements for crewed platforms. Based on extended testing and operations, militaries are gaining a better understanding of where the 'sweet spot' for autonomy is and where it offers the best capability return on investment. These developments are highly likely to accelerate in the near term.



Dr Marcus Hellyer is Head of Research at Strategic Analysis Australia as well as Director Strategic for C2 Robotics. He is also an Expert Associate at the Australian National University's National Security College. Marcus has spent his career addressing thorny analytical issues and wicked problems. Previously he was a Senior Analyst at the Australian Strategic Policy Institute where he unpacked defence budget, capability and industry issues. This included demystifying the Defence Department's budget in seven editions of *The Cost of Defence*. Marcus worked for 12 years in the Defence Department, primarily in its contestability function where he held several Senior Executive Service positions. This involved conducting independent capability and cost analysis of investment proposals as well as ensuring the best advice possible was provided to the Government and senior decision makers on major capital acquisitions. He also administered Defence's capital acquisition program. Marcus has also worked in the Australian Intelligence Community. Before that he had an academic career as a historian in the USA.

Capability Offsets: Exploring the Promised Opportunity of Emerging Technology

Adam Hepworth (Army’s Robotic & Autonomous Systems Implementation & Coordination Office)

The use of technologies on the battlefield is increasing, and warfare is evolving both in the physical and information domains. To ensure the Army can maintain an advantage and meet future threats, we must consider how humans can operate alongside machines and best use capabilities with human-machine teaming constructs. Current systems require substantial human input to employ technologies meaningfully across a range of settings, limiting the promised capability and capacity potential. Of particular importance is considering the impact of systems that can improve the speed and accuracy of the human decision-making cycle and how the Army’s workforce will need to adjust to prepare for the future.



Lieutenant Colonel Adam Hepworth, PhD leads the exploration of Artificial Intelligence within Army’s Robotic and Autonomous Systems Implementation and Coordination Office (RICO). Adam’s portfolio includes human-cognitive augmentation, autonomous systems, AI-enabled decision-making, and human-machine teaming and swarming. Adam holds a Bachelor of Science in Mathematics from the University of New South Wales, a Master of Logistics and Supply Chain Management from the University of South Australia, a Graduate Diploma in Scientific Computation from the United States Naval Postgraduate School, a Master of Science in Operations Research from the United States Naval Postgraduate School, and a Doctor of Philosophy (PhD) in Computer Science from the University of New South Wales. Adam was the 2022 Chief of Army Scholar at the Australian Army Research Centre and is presently a Visiting Fellow at the University of New South Wales, resident in the School of Systems and Computing. His current research contributes to swarm shepherding for human-swarm teaming, activity recognition and behaviour prediction, and the design of artificial intelligence systems.

The Precision Payload Delivery Systems (PPDS) – aka the Cardboard Done: A Use Case in the development of low cost, disruptive mission flexibility and the role of innovation in the battlespace

Amanda Holt (Sypaq)

As Dr Peter Layton identifies in his publication “Prototype Warfare and the Fourth Industrial Age”, the rapid advances in modern manufacturing across both the traditional Defence and broader commercial technology sectors, coupled with the rate of adoption of autonomous systems across all operational domains presents both a great opportunity to the ADF to leverage the world-class research and development capabilities resident within Australia’s academic and industrial base to rapidly generate combat mass and realise asymmetric advantage. Further, the approach to prototype development, experimentation and innovation in the battlespace are critical inputs to ensure that the ADF is able to harness these disruptive innovations at the speed of relevance. This presentation will address lessons learned from the initial prototyping and experiments, through initial development, industrial scale-up through to operations, and continual evolution of the Corvo PPDS (aka the Cardboard Plane) and the relevance to the way we collaborate with our military partners globally when introducing and supporting disruptive technologies.

Amanda Holt holds tertiary qualifications in Aerospace Engineering and Business, complemented by post-graduate studies in Remote Sensing, Systems and Software Engineering, and has recently completed the Senior Executive MBA at Melbourne Business School. Amanda commenced her career in Military Systems Engineering, developing interoperable Combat, Communications and Simulation Systems for the Royal Australian Navy working with Adacel, ADI, and Thales. She further developed her understanding of the development and integration of military systems upon joining SYPAQ in 2007, working with capabilities as broad as Naval Aviation, Army Aviation, Aerospace Weapons Systems, Collective Training Systems, C4ISREW Systems, UAV Capabilities, Modelling & Simulation and Joint Intelligence Capabilities. In 2015, Amanda was appointed as SYPAQ’s Chief Executive Officer. SYPAQ employs almost 200 engineering and technical personnel across Australia, delivering specialist services and research and development programs in the fields of C4ISREW, trusted autonomous systems, military communications, artificial intelligence, and DevSecOps platforms. Amanda is a Fellow and Engineering Executive of Engineers Australia, a member of Defence Council of Victoria, Industry Co-chair for the Land Environmental Working Group and Maritime Environmental Working Group, member of the RMIT Aerospace Engineering Advisory Board and Non-executive Director of PWR Holdings.



Drone Racing’s utility to contemporary operations and the next tech leap
 Keirin Joyce (Royal Australian Air Force)

5 years ago, Drone Racing was just a sport. The UKR/RUS conflict has taken those commercial technologies and applied them in an asymmetric fashion to generate the greatest contribution thus far to the democratisation of air power. This presentation will discuss what’s next in this technology set and proposes Australia’s part in that.

WGCDR Keirin Joyce, CSC, is an Australian Defence Force Academy graduate with an Honours Bachelor of Aeronautical Engineering. WGCDR Joyce has spent the last 18 years in support of the ADF Uncrewed Aerial Systems (UAS) capability including deployment to Iraq and Afghanistan. WGCDR Joyce is a Chartered Professional Engineer, holds a Masters in Aviation Management (specialising in Human Factors), a Masters of Aerospace Engineering, a Masters in Military and Defence Studies, a Graduate Diploma in Secondary Education (Mathematics) and has researched part time as a Doctorate of Philosophy student through ADFA. He is currently the Chief Engineer for RAAF RPAS MQ-4C Triton. Before that, WGCDR Joyce was the Australian Army UAS Sub-Program Manager responsible for all Australian Army UAS activities, including Army Drone Racing, and then the Royal Australian Air Force Remotely Piloted Aircraft Systems (RPAS) Sub-Program Manager. Keirin is married to Rachael, they have four children and he is the President of the ADF Drone Racing Association.



Algorithmic Warfare, AI, and Achieving the Asymmetric Outcome

Mike Kelly (Palantir)

The development of AI in military decision making is a topic of increasing importance in today's world. Palantir Technologies, a company with a long history of providing decision dominance to the United States and its allies, has been at the forefront of these developments. Through investments in R&D and global partnerships, Palantir has focused on developing software that is proven on the battlefield, is subject to continuous evaluation and improvement based on feedback from users and stakeholders, as well as on ethical and legal considerations. AI adoption requires a shift towards data-driven and evidence-based decision making and a willingness to experiment and learn from failures. The benefits of AI tools in decision making are clear. For example, AI can help automate the identification and prioritisation of relevant potential matches, leaving more time for human analysts to examine and validate the highest signal identifications and construct better-informed courses of action based on that information. However, technology must fulfil both mission needs and ethical imperatives. Principles like distinction, proportionality, and military necessity must be integral to regulations and procedures that govern the development and deployment of AI in weapons systems.

Associated with this is the essential elements of testing, simulation and modelling, ongoing maintenance, and reliability. In determining the path to AI adoption we do not need to assume that a perfect data foundation is a prerequisite. If we look at Project Maven in the US, it was the algorithms that showed us where the data needed curating. These things move together, and in the urgency of current geo-political circumstances we must embrace a concurrent activity construct. It is also important to be agile enough to adopt a constant “design, test, build” iterative approach to maintain technical advantage, accelerated by AI tools. Associated with this is the need for coordinated coalition approaches to accelerate deployment of advanced technology, enable interoperability. We must also strive to enhance collaborative platforms and mechanisms across Defence industry. To succeed, we need to cut through the existing ways we organise and procure weapons systems beginning with software and AI. Defence should field AI to our operators at the earliest possible moment. This is how we achieve the deterrent effect we need right now and ensure that we prevail in the worst-case scenarios.

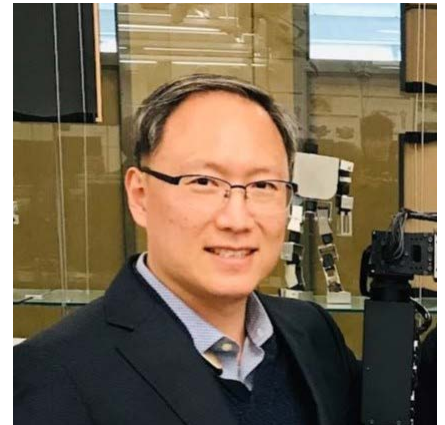
COL The Hon Dr Mike Kelly AM (ret'd). Dr Mike Kelly was appointed President of Palantir Technologies Australia in 2020. Prior to joining Palantir Australia, Dr Kelly served as a Member of Parliament from 2007 to 2013 and again from 2016 to 2020. Dr Kelly held several executive positions in the Rudd and Gillard Governments, including serving as Minister for Defence Materiel in 2013. During his second term in Parliament, Dr Kelly was the Assistant Shadow Minister for Defence Industry. He sat on the Shadow National Security Committee, and was a member of the Parliamentary Joint Committee on Intelligence and Security. Before entering Parliament, Dr Kelly served in the Australian Army for 20 years, during this time he was deployed to international operations in Somalia, Bosnia, East Timor, Iraq and a hostage recovery mission in Kenya. Dr Kelly was awarded the Chief of the General Staff Commendation in 1993, made a Member of the Order of Australia in the Military Division in 1994 and received the United Nations Force Commander's Commendation in 2002. Dr Kelly is a leading expert on peace and stabilisation operations, post-conflict reconstruction, counter terrorism and counter-insurgency. He holds a PhD from the University of New South Wales in related fields and has been a regular speaker at military training programs, defence industry and international conferences. He has published two books along with numerous articles and chapters in books. Dr Kelly is based in Canberra.



AI driven Autonomous Targeting Process for Minimizing Collateral Damages

Jong Hwan Kim (Korea Military Academy Seoul)

The rapidly advancing AI technology is now finding its place within autonomous defense weapon systems. South Korea is actively engaged in cutting-edge research to incorporate advanced AI into its weapon systems. This endeavor seeks to maintain peace and stability on the Korean Peninsula in the face of persistent military provocations from North Korea, while also addressing the issue of diminishing manpower resources. The concept of employing autonomous weapon systems on the future battlefield has been anticipated for a long time. However, the idea of autonomous weapon systems posing a threat to human life is truly terrifying, and situations in which innocent civilians are harmed due to the use of the autonomous weapon systems must be avoided at all costs.



Considering this, this study introduces a process for autonomous target detection using AI. To avoid targeting innocent civilians, only individuals wearing combat uniforms are labeled as positive targets, while the attire of civilians is set as negative target in the labeling process. In addition, to facilitate quick learning and execution, transfer learning techniques were applied, and data collection included the even collection of data on South and North Korea soldiers and civilian attire. As a result of this comprehensive training, an AI model capable of effectively distinguishing between North Korea soldiers and South Korea soldiers, as well as differentiating both innocent civilians, has been developed. It is hoped that this technology will be utilized in military operations involving autonomous weapon systems to enhance combat efficiency while critically minimizing the collateral damages in future battlefield.

LTC Jong Hwan Kim, PhD is an Associate Professor at Korea Military Academy Seoul, where he is Head of the department of Mechanical & Systems Engineering. He received a PhD in Mechanical Engineering from the Virginia Polytechnic Institute and State University in 2014 and a Masters in Mechanical and Aerospace Engineering from New Mexico State University in 2007. He has published widely on topics related to the military and civilian applications of AI and robotics. Some of his research interests include: Intelligent Combat Systems for multiple UGV operation and future individual combat systems; Intelligent system capable of analyzing environments and determining multiple objects using thermal imagery; Probabilistic estimation for ballistic velocity limit; Low cost, easy maintenance intelligent security system for DMZ in S. Korea fusing Radar and IR thermal cameras. He was awarded multiple times as “Best Professor” and “Author of the Best Research Paper” by his institution.

Japan’s approaches to military applications of autonomous technologies

Yuka Koshino (International Institute for Strategic Studies)

Given the deteriorating strategic environment surrounding Japan driven by growing tensions in the East and South China Sea and Russia’s War in Ukraine, Japan is going through a major transformation of defence posture and capabilities development to enhance its deterrence and response capabilities in the Indo-pacific region, together with allies and partners. In December 2022, Tokyo released its National Security Strategy for the first time as well as its first National Defense Strategy and Defense Buildup Plan and committed to double its defence budget by the end of FY 2027 to ‘fundamentally reinforce’ its defence capabilities. Like other major militaries, these documents highlighted autonomous technologies as one of the focus areas to achieve defence innovation of the Japan Self-Defense Force (JSDF). Against this backdrop, this presentation will discuss the below themes to examine Japan’s unique approaches to military adoption of artificial intelligence to enhance the security of Japan and the Indo-Pacific region: (1) How does Japan perceive the drastically changing strategic environment and how is it seeking to respond to it? (2) What are the drivers behind Japan’s military applications of autonomous technologies? (3) What are opportunities as well as institutional, organisational, and cultural challenges for Japan to explore and adopt autonomous technologies for defence use? (4) To what extent does the Japanese approach resonate with and harmonise with other approaches emerging in the Indo-Pacific region? (5) How is Japan seeking to utilise existing alliances, mini-lateral and plurilateral frameworks to maintain its technology competitiveness and to set rules, norms, and standards for autonomous technologies? (6) How capable are Japanese defence industrial and technological bases to meet Japan’s defence demands of autonomous technologies? (7) Finally, how does it seek to balance sovereign capabilities or capabilities of its allies and partners to equip the Japanese militaries with the most advanced and cost-effective technologies?

Yuka Koshino is a Research Fellow for Security and Technology Policy at the International Institute for Strategic Studies (IISS) where she carries out independent research on the impact of emerging technologies on security from defence and geo-economic perspectives. She is the co-author of *Japan’s Effectiveness as a Geo-economic Actor: Navigating Great-power Competition* (Routledge, 2022). She is also serving as International Strategy Fellow with the Schmidt Futures. Prior to joining the IISS, Yuka worked at the Japan Chair at the Center for Strategic and International Studies (CSIS), where she focused research on US–Japan relations and US strategy in the Indo-Pacific region. She also has experience providing policy and business analysis on Asia’s high-tech and defence industries at the Avascent Group and the Asia Group in Washington DC. She previously reported and published news stories on Japanese political, economic and business affairs at the Tokyo bureaus of the *Wall Street Journal*, the *Economist* and the *Japan Times*. She holds a Master’s in Asian Studies from the Edmund A. Walsh School of Foreign Service at Georgetown University and a BA in law from Keio University.



The impact of robotics and other advanced technologies on the character of future conflict in the Indo-Pacific

Ian Langford (UNSW Canberra, Defence Research Institute)

The presentation will seek to outline and discuss the convergence of technology and military capabilities across throughout the Indo-Pacific; it will provide an overall context outlining the general uplift of military technology amongst Pacific powers, to include the United States, China, and Australia as well as apply it within a military concept such as Anti-Access, Area Denial. Specific technologies to be discussed include Robotics and Automation, Artificial Intelligence, Space-based sensing and alternate precision navigation timing, as well as hypersonics and high-speed computing.

Dr Ian Langford, PhD, DSC and Bars served in the Australian Army for 31 years, retiring as a Brigadier in 2023. Ian has held a range of appointments in the Army and Special Forces throughout his career. Ian commanded the 2nd Commando Regiment, as well as multiple Special Operations Task Groups in Afghanistan, Iraq, and on domestic counter-terrorism duties. Ian has also led the at the strategic level, responsible for the Army's future strategic investments, future concepts and capabilities, major capital acquisitions and critical sustainment systems as the Head of Land Capability on two separate occasions in both 2019/20 and again in 2022. Ian Langford's operational service includes deployments to Timor Leste, Afghanistan, Bougainville, Solomon Islands, Iraq, Israel, Lebanon, Syria, and the South-West Pacific. For his service, Ian has been awarded several Australian commendations, and the Distinguished Service Cross on three occasions. In 2019, he was appointed as an Honorary *Aide de Camp* to the Governor-General of the Commonwealth of Australia. He was also until recently the patron of the *Defence Entrepreneur's Forum*, an internationally recognised innovation pathway for young leaders as part a global defence innovation network. Ian Langford is a Distinguished Graduate of the United States Marine Corps *Command and Staff College* and the *School of Advanced Warfighting*. He is a Distinguished Graduate of the Australian Institute of Company Directors *Company Directors Course*. He has also completed the *Senior Executive Leadership* program at the Australian National University as well as the *Senior Leadership in National Security* and the *Senior Leadership in Government* program from the Kennedy School of Government, Harvard University. Ian holds a bachelor's degree in management, a Master of Arts, a Master of Defence Studies, a Master of Strategic Studies and a Doctor of Philosophy from Deakin University. He has been published dozens of times as an independent author, essayist and editor. In 2022, Since retiring from the Army, Ian has since formed his own advisory company, Burran Consultancy. He holds several Board positions, including a Australian Listed Investment Company, and advises small and large firms across the private sector. He is also tenured as an Associate Professor at the University of New South Wales, where he teaches at the post-graduate level on international relations as well as undertakes his own research.



Thinking Conflict, Competition and Cooperation: Using Cognition as an Organising Construct

Peter Layton (Griffith Asia Institute, Griffith University)

Artificial intelligence (AI) is seen as central to robotic autonomous systems but that phraseology unhelpfully conflates technologies with a quality of an entity. Instead, moving up the ladder of abstraction and taking a much broader view might be useful. This might be particularly valuable as AI is a general purpose technology (GPT) that is shaping and being adopted across all of society, not just the military. GPTs are uncommon and only occasionally experienced. For militaries, GPTs do not have the same generic characteristics as the more customary, tightly-focussed innovations that address particular defence problems or needs, often within a narrowly defined area. An attribute of both humans and AI is cognition, in rather simplified terms the processes involved in thinking. IBM called AI cognitive machines, implying that human-machine teaming at its core involves a shared cognition, or at least a process of collective thinking. In some respects that's unsurprising, as cognition is central to all human activities, including the use of technology in warfare. Indeed, today's preferred military doctrine of manoeuvre is all about disrupting the adversary's cognition in a way that is to your favour. There is growing interest in the so-called cognitive domain and cognitive warfare although these suggest exclusion of much and a certain narrowness of perception. A much wider perspective seems needed. If cognition permeates both human and autonomous systems and is omnipresent in their activities, might shifting to using cognition as an overarching organising construct be useful? Such a shift could shape the future composition, doctrine, and strategic posture of military forces with impacts at the operational, strategic and grand strategic levels. This talk will initially discuss what cognition as an organising construct might encompass before examining the implications of such a conceptual move, before ending with where such a perspective might take us.



Dr Peter Layton is a Visiting Fellow at the Griffith Asia Institute Griffith University, a Royal United Services Institute Associate Fellow, and a Fellow of the Australian Security Leaders Climate Group. He has extensive aviation and defence experience including flying fast jets and maritime patrol, force development, major equipment projects and as a defence attaché. For his work at the Pentagon on force structure matters, he was awarded the US Secretary of Defense's Exceptional Public Service Medal. Dr Layton has a doctorate from the University of New South Wales on grand strategy and has taught on the topic at the Eisenhower School for National Security and Resource Strategy, US National Defense University. He has undertaken a Fellowship at the European University Institute, Fiesole, Italy. Dr Layton is widely published in Australia and internationally. His research interests include grand strategy, national security policies particularly relating to middle powers, defence force structure concepts and the impacts of emerging technology. He contributes regularly to the public policy debate on defence and foreign affairs issues and is the author of the book *Grand Strategy*. He is co-authoring a new book, *Warfare in the Robotic Age* to be published early 2024. His posts, articles and papers may be read at <https://griffith.academia.edu/peterlayton>

Battlefield Trust for Human-Machine Teaming: Evidence from the US Military

Paul Lushenko (the U.S. Army War College)

Experts agree that future warfare will be characterized by countries' use of military technologies enhanced with Artificial Intelligence (AI). These AI-enhanced capabilities are thought to help countries maintain lethal overmatch of adversaries, especially when used in concert with humans. Yet it is unclear what shapes servicemembers' trust in human-machine teaming, wherein they partner with AI-enhanced military technologies to optimize combat performance. In October 2023, I administered a conjoint survey at the US Army and Naval War Colleges to assess how varying features of AI-enhanced military technologies shape servicemembers' trust in human-machine teaming. I find that trust in AI-enhanced military technologies is shaped by several technical specifications, namely their non-lethal purpose, heightened precision, and human oversight; perceived effectiveness in terms of civilian protection, force protection, and mission accomplishment; and, oversight. These results provide the first experimental evidence of complex military attitudes for manned-unmanned teams, which have research, policy, and modernization implications.



LTC Paul Lushenko, PhD is a Lieutenant Colonel in the U.S. Army and Director of Special Operations at the U.S. Army War College, where he also teaches. He commissioned as a Military Intelligence Officer in 2005 following graduation from the United States Military Academy as a Distinguished Honor Graduate. He won a Rotary Ambassadorial Scholarship and studied at The Australian National University from 2010-2012, where he received a Master of Arts in International Relations and a Master of Diplomacy. He then earned a Master of Defense and Strategic Studies from the U.S. Naval War College in 2016, graduating #1 in his class. Paul is also a Council on Foreign Relations Term Member, Adjunct Research Lecturer for the Australian Graduate School of Policing and Security at Charles Sturt University, and Non-Resident Senior Fellow at the Cornell University Brooks School Tech Policy Institute. He is the co-editor of *Drones and Global Order: Implications of Remote Warfare for International Society* (Routledge 2022), which is the first book to systematically study the implications of drone warfare on global politics. He has written and lectured widely on drone warfare, irregular warfare, and regional security order-building, and his current research focuses on evolving patterns of drone warfare globally and public perceptions of legitimate strikes. Paul's second book, *The Legitimacy of Drone Warfare: Evaluating Public Perceptions* (Routledge), is forthcoming.

Future of loitering munitions in the Asia-Pacific

Oishee Majumdar (Janes)

Countries in the Asia-Pacific are showing interest to acquire loitering munitions to enhance military preparedness in response to the increasingly hybrid and automatised nature of warfare. The extensive use of loitering munitions in the ongoing Russia-Ukraine conflict, and the Nagorno-Karabakh conflict provided a further impetus to the development or procurement of such systems. Janes data indicates that the loitering munitions market in the Asia-Pacific will grow by many folds over the coming decade with China leading the market growth. Beijing's military-civil fusion strategy has accelerated

local production of loitering munitions by encouraging government agencies to collaborate and leverage the capabilities of domestic private companies. Growing geopolitical competition and concerns about China’s military activities in the region have also prompted countries like India, Taiwan and South Korea to accelerate the development or acquisition of loitering munitions. These countries have supported partnerships between local industry and foreign companies to advance the development of loitering munitions for their militaries. Other countries in the Asia-Pacific such as Indonesia, Singapore, Australia, Malaysia, and New Zealand are also very likely exploring opportunities to procure loitering munitions. For example, earlier this year the New Zealand Defence Force (NZDF) told Janes that it is conducting its first experimentation with loitering munitions. The presentation will highlight the market trends in the Asia-Pacific related to loitering munitions, major platforms, ongoing research and development by different countries, integration of artificial intelligence to advance these systems, and how the increasing focus on such systems can impact possible conflicts in the region.

Oishee Majumdar is the C4ISR Reporter for Janes in the Asia-Pacific. She has written more than 250 articles for Janes since early 2022 reporting and analysing military developments and trends in the region. Her writing has been focused on a range of topics including autonomous capabilities, emerging technologies, electronic warfare, cyber, and space, among others. Prior to Janes, Oishee worked as a correspondent at Reuters. She has previously worked as a researcher at the National Institute of Advanced Studies, engaged in projects primarily related to Afghanistan and Pakistan. She has also worked at the Observer Research Foundation, conducting research for projects under the think tank’s Strategic Studies and Maritime Initiative. Oishee holds an MA in International Studies and a BA in English, Political Science and History, both from Christ University, Bangalore.



DARPA's ADvanced Acclimation and Protection Tool for Environmental Readiness (ADAPTER)

Katina Michael (School for the Future of Innovation in Society and School of Computing and Augmented Intelligence, Arizona State University)

This presentation focuses on describing the Defense Advanced Research Project Agency's (DARPA) ADvanced Acclimation and Protection Tool for Environmental Readiness (ADAPTER) Program. ADAPTER is a travel adapter for the human body, an implantable or ingestible bioelectronic carrier whose main functions are to help warfighters achieve the goal of better sleep cycles and the diminishment of traveler's diarrhea while on deployment. The focus of the presentation will be on (1) what it means for a soldier to have an embedded semi-autonomous system within, and (2) whether such complex socio-technical systems could be weaponized in the future. This presentation uses a normative approach to address the question of desirability and permissibility of an implantable in a soldier, presenting a conceptual framework for Ethical, Legal and Social Aspects (ELSA). Scenarios will be used to demonstrate the importance of transdisciplinary perspectives in designing better products and processes within an open systems context, despite the emphasis on defense.



Prof Katina Michael BIT, MTransCrimPrev, PhD (Senior Member IEEE, ACM SIGCAS), is a Professor with Arizona State University and a Senior Global Futures Scientist with the Global Futures Laboratory. At ASU, she has a joint appointment with the School for the Future of Innovation in Society and School of Computing and Augmented Intelligence. Katina’s research focuses on the social implications of emerging technologies. She was responsible for establishing the Human Factors Series in the Research Network for a Secure Australia (RNSA 2005-2009), was an external member of the Centre of Excellence in Policing and Security (CEPS 2009-2013) and ran the Social Implications of National Security (SINS) workshops from 2006 to 2022. Since

2021, Katina has advised DARPA on matters pertaining to ethics, law, and societal implications (ELSI) of complex socio-technical systems. She has been funded by the National Science Foundation, the Canadian Social Sciences and Humanities Research Council, and the Australian Research Council. She is the Director of the Society Policy Engineering Collective, the Founding Editor-in-Chief of the IEEE Transactions on Technology and Society and was formerly Editor-in-Chief of the IEEE Technology and Society Magazine and Editor at Computers & Security. She is the Founding Chair of the ASU Master of Science in Public Interest Technology, and Technical Committee Co-Chair of Socio-Technical Systems at IEEE. Prior to academia, Katina was employed by Nortel Networks, Anderson Consulting, and OTIS Elevator Company.

Disinformation Bots and the Indo-Pacific

Gavin Mount (UNSW Canberra)

Current conditions of geopolitical uncertainty have generated significant attention on how major powers deploy information operations and disinformation tactics across the Indo-Pacific region. The growing popularity of social media networks makes it possible for digital messages to be disseminated widely, deeply, and quickly culminating in a rise of “fake news”, “deep fakes” and “post-truth” politics. In response, there has also been a rise of fact-checking organisations but these too are prone to politicisation, capture and misappropriation. Machine learning enhanced microtargeting strategies directed at elections have been effective in delivering unexpected political outcomes over the last decade. Accelerating these challenges, we can discern the increased use of automated systems or “bots” delivering disinformation to targeted audiences as an important and observable tactic of these information operations. Tailored to exploit the conditions in individual countries, their intended effect is to disrupt existing social, political and economic stability through efforts to control and absorb traditional media, obfuscate attack sources through technological, commercial and legal means and to disguise these influence as partisan efforts. Rapidly evolving AI assisted disinformation tools have the potential to act as force multipliers to enhance or degrade the strategic posture of Indo-Pacific powers. When used in conjunction with robust diplomacy, political interference and so-called “grey zone” influence strategies, these tools



are being used to exert pressure on public opinion, commercial activities and electoral processes throughout the Indo-Pacific region. The paper reviews current scholarship to identify several strategies of resilience, diplomatic initiatives and strategic lines of operation for managing resources to respond to the challenges of disinformation across the Indo-Pacific region.

Dr Gavin Mount is a Senior Lecturer at UNSW Canberra. His primary areas of research expertise have been in the areas of ethnic conflict and nationalism. More recently he has been publishing on political influence using microtargeting, hybrid warfare, the use of simulations in decision-centric warfare. Gavin has extensive experience providing education to defence personnel at ADFA and the Australian Command and Staff College. The recipient of several teaching awards, he teaches in the subjects of great power politics and conflict transformation and is currently leading an international team on the pedagogies of war crimes. He holds several editorial positions including commissioning editor of *Australian Outlook* since 2016. This research is part of a broader collaboration with the University of Calgary on disinformation in the Indo-Pacific.

Navigating the Moral Landscape of Lethal Autonomous Weapons Systems: A Critical Examination of Responsibility Gaps

Ann-Katrien Oimann (Royal Military Academy and KU Leuven (visiting fellow at UNSW Canberra)).

Artificial Intelligence (AI) is currently used in numerous applications and in various fields, including the military domain. With the advent of second-generation AI systems, we see an increase in the degree of autonomy in decision-making systems. This leads to discussions on the possible future use of lethal autonomous weapons systems (LAWS). A central issue in the discussions on LAWS is the problem of assigning moral responsibility for some AI-caused outcomes. Several authors claim that the high autonomous capability of such systems leads to a so-called "responsibility gap" where no one can be held morally responsible anymore.

The reason for this, on the one hand, is that it would be unfair to hold humans responsible as they no longer control the system, and on the other hand, that it is impossible to hold the system itself responsible as it has no consciousness and cannot be the addressee of punishment. In both philosophical and legal literature, various positions have been taken regarding the responsibility gap and very different solutions have been devised to close the gap, but it is often unclear how they relate to each other. In order to make progress in research around LAWS and responsibility and to be able to argue for or against the use, it is necessary to have a clear overview. This talk attempts to do so by disentangling the various arguments and providing a critical overview using three differentiators: (I) those who believe in the existence of responsibility gaps versus those who do not, (II) those who hold that responsibility gaps constitute a new moral problem versus those who argue they do not, (III) and those who claim that solutions can be provided as opposed to those who believe that it is an unsolvable problem. For recent debates at the international level, see among others: meetings organized by the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems of the Convention of Certain Conventional Weapons (CCW) in the UN, first international summit on Responsible AI in the Military Domain (REAIM) organized by the government of the Netherlands together with the republic of Korea that took place in The Hague on 15 and 16 February 2023 which resulted in a political declaration to take action, recently updated



DoD Directive 3000.09 “Autonomy in Weapons Systems”, various speeches by UN Secretary-General António Guterres, the Campaign to Stop Killer Robots (global coalition calling for a new international treaty to ensure weapons are always controlled by humans) etc.

Ann-Katrien Oimann is a researcher and PhD candidate at the Royal Military Academy of Belgium in collaboration with the KU Leuven Institute of Philosophy. Her research focuses on the military use of AI in the context of the development of semi-autonomous and fully autonomous weapon systems. In her doctoral thesis, she investigates the morality of the use of LAWS and the problem of attributing moral responsibility. More broadly, her main academic interests are focused on the intersection of ethics, artificial intelligence and law. In March 2022, Ann-Katrien also joined the third cohort of the Europaeum Scholars Programme, which is a two-year training programme in European policy and leadership. Before starting as a PhD researcher, Ann-Katrien obtained her Bachelor and Master in Philosophy at the KU Leuven and an LLM in IP and ICT law at the KU Leuven where she mainly dealt with privacy and data protection.

Adaptation, Innovation, or Transformation? Imagining the Changing Character of War in the Indo-Pacific

Alessio Patalano (Centre for Grand Strategy, King’s College London)

Meeting the challenges of future war is the hardest task that any strategic planner has to face. Indeed, as Sir Lawrence Freedman has recently pointed out, the act of debating the future of war for the purpose of preparing to face it is one of the very constant features of history. This is a particularly challenging task for navies and naval planners faced with the question of assessing the future of war in a maritime context. This is because maritime forces - that is those components of the armed forces who are likely to be called upon to operate in a maritime context - are platform-centric and technology intensive organisation and, as a result, are particularly sensitive to technological changes. The introduction of the dreadnaught capital ship, mines, submarines, aircraft carriers, and long-range missiles, have all punctuated the dramatic changes of war at sea in relation to the transformative nature of specific technologies and their application for the development of new capabilities. Notably, in the interwar period, how submarines and carriers would affect the future of war at sea was imagined in a rather different way to how these capabilities came to affect the Second World War. This was particularly true in the waters of the Indo-Pacific region.

Today, we are seemingly living at a time of significant technological change, one in which there is a growing temptation to suggest that we are witnessing at a similarly transformative change in the character of war at sea. Is this really the case? Or, are we witnessing at significant changes that will drive major adaptation and innovation instead of full-fledged transformation? This talk addresses the above questions by focusing on three types of emerging technologies that stand at the centre of debates around the study of war: uncrewed, autonomous, and AI technologies. In particular, the talk will seek to place recent experience in the context of the maritime theatre of the War in Ukraine in the context of planned investments and concept of operations developed in key regional state actors in the Indo-Pacific region, with a specific reference to Japan - the regional actor with the longest continuous strategic focus on a maritime-centric force posture to address stability in the Indo-Pacific. Within this context, the talk will offer some reflections on the crucial need to constantly review the link between the typology of any potential future conflict and the objectives set in it for maritime forces for any assessment on the impact of technology on the character of war to remain relevant.



Dr Alessio Patalano is Professor of War & Strategy in East Asia at the Department of War Studies (DWS), King’s College London (KCL) where he specialises in maritime strategy and doctrine, Japanese military history and strategy, East Asian security, and British defence policy towards the Indo-Pacific. Prof Patalano is the Director of the King’s Japan Programme and the newly established Indo-Pacific Programme at the Centre for Grand Strategy, a Fellow of the Royal Historical Society (FRHistS), a Visiting Professor at the Japan Maritime Command and Staff College (JMCSC), and an Adjunct Fellow at the Institute of Contemporary Asian Studies, Temple University Japan. He is a Senior Fellow at the think tanks Policy Exchange, Royal United Services Institute (RUSI), and Sir Herbert Richmond Fellow on

naval strategy at the Council on Gestrategy. He is also visiting fellow at the Royal Navy Centre for Strategic Studies (RNCSS) and non-resident fellow at the Royal Australian Navy Seapower Centre. From 2006 to 2015, he was visiting professor at the Italian Naval War College (ISMM), Venice. In Japan, Prof Patalano has held affiliations at Aoyama Gakuin University, the National Defence Academy, and at the National Graduate Institute for Policy Studies (GRIPS). In 2022, Prof Patalano became the first specialist advisor on the Indo-Pacific to the Foreign Affairs Committee in the UK Parliament. Prof Patalano is an active media commentator and writer (Nikkei, The Spectator); he collaborates on international documentaries, and is also regularly involved in military education, developing and delivering programmes on East Asian affairs.

Fly or die: The rapid advance of UAS technology and operating concepts in the Russia-Ukraine conflict

Carl Rhodes (Robust Policy)

In the opening weeks of Russia’s invasion of Ukraine, much of the reporting focused on the effectiveness of the tank-killing Bayraktar TB2 UAS in the hands of Ukraine’s Air Force. Russian tactical adaptations, use of electronic warfare and kinetic engagement of the Turkish-made TB2s in the air and on the ground over the coming months would completely negate their effectiveness. The result of this adaptation was the loss of over 100 of TB2 aircraft at a cost of roughly \$7 million each. In recent months, smaller, expendable drones, adapted from commercial technology, serve as essential surveillance and reconnaissance tools. Ukraine has also found great success by adapting first-person-view aircraft, originally designed for drone racing, to deliver explosives against Russian targets. Interceptor UAS have even been developed specifically to counter enemy quadcopter UAS, diving onto their top surface to break a rotor blade. Such rapid and dramatic changes in the UAS operating concepts and technology, meant to gain and maintain advantage, have been undertaken by both nations over 20 months of this conflict. There has also been a rapid evolution in methods to counter UAS and leverage UAS. Ukrainian command and control apps have been built to rapidly gather targeting quality information from UAS and other systems. Such improvements have resulted in increased strike effectiveness by UAS, artillery and other assets. Starlink, a commercial satellite constellation, has proven essential to



Ukrainian communications at all levels of operation. This talk will examine the evolution of UAS and their enabling systems to provide lessons for future conflict. Some discussion of the ethical implications associated specific improvements will also be provided.

Dr Carl Rhodes, director and founder of Robust Policy, has over 25 years of experience delivering policy analysis and actionable recommendations for senior government and military leaders in both Australia and the United States. Carl has experience as a researcher, leader, and manager of policy analysis efforts and is active across several portfolios including defence technology and acquisition, national security strategy and defence people issues. Completed efforts over the last 5 years includes analysis related to sovereign weapons, Navy robotics and autonomous systems, the protection of sensitive technology and the 2018 U.S. Nuclear Posture Review. Carl worked at RAND Corporation from 1997-2021 and held several management positions including director of RAND Australia. Carl earned a Ph.D. in chemical engineering from Caltech.

AUKUS and the challenge of time

Dr Lesley Seebeck (University of New South Wales Canberra, School of Professional Studies)

The realisation of AUKUS’s ambitions is complicated by distended, shifting and misaligned time frames. Some time frames shift due to technological change; others to geopolitical circumstances; and many in unpredictable, non-linear ways. But rather than being caught up in simply delivering AUKUS at all, we need to ensure AUKUS, in some form, meets Australian strategic needs.



Dr Lesley Seebeck is a Professor of Cyber Security Strategy and Leadership at UNSW Canberra, an independent consultant and Senior Fellow, Strategic Analysis Australia. She has held senior executive roles in the federal government and was the former head of the ANU Cyber Institute. Prof Seebeck has a PhD in information technology, an MBA, a Masters in Defence Studies and a Bachelor’s degree in Applied Science (Physics). Her writing and further details can be found at lesleyseebeck.com.

Minotaur Warfighting in the Indo-Pacific?

Robert Sparrow (Monash University)

Future wars will be fought by humans and machines working together. Paul Scharre has championed the idea that human beings will command machines, or teams of machines, leveraging the distinctive capacities of each type of warfighter. Scharre calls this “centaur warfighting”. Humans are cognitively robust, flexible decision-makers, good at taking context into account, and responding to unexpected circumstances: machines have superior sensors, speed, strength, and power. Teams of machines lead by humans will, Scharre argues, win victory over either humans or autonomous weapon systems when they fight alone. A centaur is a mythical creature with the head and upper body of a man and the lower body of a horse. When used to describe manned-unmanned teams, the image of the centaur promotes the idea that human beings will lead the team. In a paper recently

published in the journal of the US Army War College, *Parameters*, with co-author Adam Henschke, I have outlined an alternative vision of manned-unmanned teams, which I believe is more likely to be realized in key domains of warfighting in future wars. Rather than human beings directing multiple robots, I suspect artificial intelligences (AI) will direct the activities of multiple human beings.

The cyborg soldier of the future is more likely to be a minotaur—a mythical creature with the body of a man and the head of a bull—than a centaur: they will have a monstrous head rather than a monstrous body. Artificial intelligences are arguably already more capable of performing the cognitive tasks most relevant to warfighting than robots are capable of performing the functions of the human body most relevant to warfighting. Advances in the applications of AI are emerging more rapidly than are advances in robotics. For the foreseeable future, in many domains, it will be more plausible to substitute machines for humans where humans have executive roles than where humans have roles involving the manipulation of objects or movement through cluttered environments. Indeed, we have suggested that there will often be an ethical imperative to place human beings under the control, supervision, or command of AI.

As the tempo of military operations increases due to the introduction of new technologies, shifting battlefield command to AI will help prevent fratricide and enhance the survivability of human warfighters. Given the pace at which AI is improving there is an urgent need to consider the implications of minotaur warfighting, both for the effectiveness of the fighting forces of the future and for the human beings who will increasingly fight wars at the direction of machines. In this presentation, I will introduce the idea of minotaur warfighting and the dynamics that suggest that minotaurs will be victorious over centaurs, autonomous weapons, or purely human forces. I will also offer some speculations about the implications of cultural differences between the nations and the militaries in the Indo-Pacific for the extent to which they are likely to be able to meet the challenges posed by the prospect of minotaur warfighting.



Prof Robert Sparrow is professor in the philosophy Department and in the Centre for Human bioethics of Monash University. At the highest level of description his research interests are political philosophy and applied ethics; he is interested in philosophical arguments with real-world implications. More specifically, he is working in, or have worked in: political philosophy, bioethics, environmental ethics, media ethics; just war theory; and the ethics of science and technology. His recent research has focused on the ethics of human enhancement and of military robotics. Rob is a philosopher who deals in the often uncomfortable real-world ethical implications of adopting new technologies. Advances being developed in all walks of science and engineering, from artificial intelligence to genetic engineering, raise fundamental issues of democracy and consent. Rob’s research focuses on formulating ethical arguments that contribute to the public and political debate on these controversial topics.

The Impact of Robotics, Autonomous Systems & AI (RAS-AI) on the Global Security

Hideo Tomikawa (The National Institute of Defense Studies, Japan)

Emerging technologies is considered as key elements for the national security. In this presentation, Robotics, Autonomous Systems & AI (RAS-AI) will be analyzed from three perspectives; control, characteristics, and impacts. First, the control aspects are discussed. The motivations for restriction of weapons which are implemented with RAS-AI include as follows; the prohibition treaty as

tabooization, non-proliferation regime as risk management, and economic security as strategic hedging. In the next, the logical and structural features that hold back the discussion on RAS-AI regulation in military use. These difficulties include the formation of consensus, the dual nature of the technology's effects, and the issues of reliability and accountability. Finally, the impact of RAS-AI at each level are regarded. At the tactical level, there is a possibility that RAS-AI will revolutionize existing theory on battlefields. At the strategic level, there is a possibility that will have a negative impact on "the strategic balance." In other words, there is a risk that the offensive/defensive balance in nuclear deterrence may be changed by RAS-AI. At the international system level, it is pointed out that innovation will become an important element of competition between great powers. In other words, competitiveness of RAS-AI affects not only trade competition, but also the outcome of long-term competition for supremacy over the international order. Now, RAS-AI has been seen as an important masterpiece that assures national security. Finally, we examined the positive and negative effects of emerging technologies through case studies. Case studies will focus on (1) chemical weapons attacks in conflict areas, (2) the use of small-scale chemical weapons that have a large impact on society as a tactic in hybrid warfare, and (3) security measures such as the CIPS Act regarding chemical supply chains. We considered trade management.



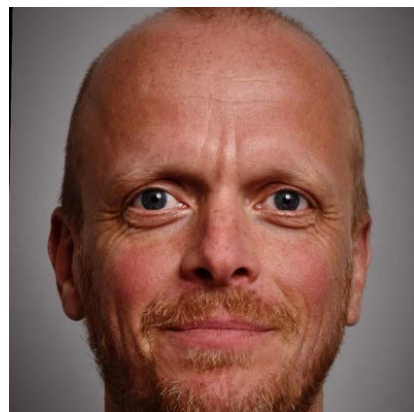
Dr Hideo Tomikawa is a Senior Research Fellow at the National Institute for Defense Studies (NIDS) at the Ministry for Defense, Tokyo, Japan.

Meaningful Human Control over Military AI: Towards Human-machine Teaming
Jurriaan van Diggelen (TNO, Defence, Security and Safety, the Netherlands)

To obey laws, ethical obligations, and regulatory and accountability frameworks, meaningful human control (MHC) over AI-enabled systems is proposed as a crucial requirement to manage moral risks in military operations. While numerous regulatory ethical standards, such as by NATO, United Nations, the United States, have recognized this idea, its operationalization remains a challenge. This is primarily owing to the wide range of different AI systems being developed, as well as the variety of circumstances in which they are deployed. We present three approaches to achieving MHC, each of which is relevant to distinct situations and AI systems. The first approach is based on realtime human control, such as teleoperation of the Reaper drone. This is a reliable and proven solution when sufficient time, capable human workforce and network infrastructure is available. If one of these requirements is not satisfied, the second approach (i.e. prior control) may be a possibility, allowing the human to be involved hours or days before the operation and then withdraw. The IAI Harpy loitering munition, for example, allows human operators to designate an enemy radar, after which the system finds and destroys it autonomously within up to two hours. This is a viable option when the human can foresee the operational conditions and the system's behavior inside it. Interface design measures like transparency and explainability can assist to realize control in this way. If the operation is too unpredictable or the system is too complex to be able to explain itself, we must resort to a third approach: incorporating the AI as a teammate.

A team comprises two or more actors working on tasks important to the organization, characterized by a common objective, social interaction, task interdependence, role and boundary management, and operates within a broader organizational framework that establishes goals,

boundaries, and constraints to coordinate with other teams. Whereas team behavior is intuitive to humans, codifying teamwork behavior in machines has been an elusive goal. Whereas the human requirements of the previous two approaches, i.e. situation awareness, cognitive taskload and predictability, are relatively well understood, human-agent teams are dependent on mutual trust and shared mental models. These notions are significantly more difficult to design and verify as they evolve over longer time spans. We argue that we must rise to the challenge and take the necessary steps to truly incorporate AI as teammates. Novel AI approaches, such as Generative AI, give computers unparalleled powers. Simple control solutions based on one-time interactions will not suffice in these scenarios and will result in unacceptable risks. The metaphor of a human-machine team provides guidance. At the same time, we must remember that people and AI systems are fundamentally different in several ways. In this session, we will look at where the metaphor applies and where it does not, as well as how current state-of-the-art AI will allow us to implement these behaviors.



Dr Jurriaan van Diggelen is a senior research scientist at the department of Human-Machine Teaming at TNO in the Netherlands. He is currently working for one year at Defence Science and Technology Group (DSTG) in Melbourne to align Dutch and Australian research on AI in defense. He has studied Cognitive Artificial Intelligence at Utrecht University and has a PhD in Artificial Intelligence and Multi-agent systems. He is program leader of the defense research program *Human-machine teaming* focusing on making humans collaborate with AI systems as teammates. Furthermore, he leads the ELSA lab consortium which aims to assure Ethical, Legal, and Societal aspects of military Artificial Intelligence. He is chair of several NATO groups on meaningful human control of AI-based systems.

Lethal Autonomous Weapons: Challenges and Opportunities

Toby Walsh (UNSW AI Institute)

For many years, academics and civil society have been warning about the risks and challenges that lethal autonomous weapons pose. Such weapon systems now are turning up in conflict zones such as the Ukraine. Only just in time, we see bodies like the UN start to take action. For instance, the General Assembly just historically voted on this issue. In this talk, I discuss the risks, challenges and opportunities that AI bring to this space.



Prof Toby Walsh FAA FACM FAAAS FAAAI FEurAI is Chief Scientist at UNSW.ai, UNSW's new AI Institute. He is a Laureate Fellow and Scientia Professor of Artificial Intelligence in the School of Computer Science and Engineering at UNSW Sydney, and he is also an adjunct fellow at CSIRO Data61. He was named by the Australian newspaper as a "rock star" of Australia's digital revolution. He has been elected a fellow of the Australian Academy of Science, a fellow of the ACM, the Association for the Advancement of Artificial Intelligence (AAAI) and of the European Association for Artificial Intelligence. He has won

the prestigious Humboldt Prize as well as the NSW Premier's Prize for Excellence in Engineering and ICT, and the ACP Research Excellence award. He has previously held research positions in England, Scotland, France, Germany, Italy, Ireland and Sweden. He has played a leading role at the UN and elsewhere on the campaign to ban lethal autonomous weapons (aka "killer robots"). His advocacy in this area has led to him being "banned indefinitely" from Russia. Toby Walsh regularly appears in the media talking about the impact of AI and robotics on society. He is passionate that limits are placed on AI to ensure the public good such as with autonomous weapons.

Generating and maintaining asymmetric advantage through RAS-AI: Opportunities and Barriers

Austin Wyatt (RAND Australia)



Historically, Australia has relied upon its technological sophistication, geographic position, personnel quality, and superior system capabilities to offset Australia’s comparatively small resource and population base, thus ensuring that the ADF can credibly deter aggression potential adversaries. However, Australia’s capability to maintain a purely technology-based capability offset is under significant threat from a confluence of factors including strong economic headwinds, a plateauing of defence spending, significant rises in military modernisation spending by its neighbours, and the high operational tempo faced by the ADF in recent years in terms of civil support operations. This adds to the difficulty of preparing a force that can deter a great power with far greater resource capacity. In the absence of

enduring technical, financial, or knowledge barriers to the emulation of autonomous technologies, one can reasonably expect rapid and repeatable diffusion amongst neighbouring militaries or even to violent non-state armed groups. The spread of the proverbial “small, cheap and many” raises the risk of a shift in the paradigm of conflict away from the high-cost, high-capability platform-centric models toward technologies that can be more easily emulated, and thus easier to overcome conventional advantages, which in turn limits value of relying on preferential access to regulated US technologies to maintain a capability advantage. Instead, the Australian Defence Force should pivot toward a model that generates (and iteratively re-generates) capability advantage through superior human-machine teaming capability and operational concepts, supplemented by targeted technical superiority. In other words, in a future conflict paradigm where everyone has access to ‘good enough’ technology, the ADF must carve out advantage through asymmetric and agile methods of warfare.

Dr Austin Wyatt is an associate researcher at RAND Australia. His research focuses on military transformation, remote, and autonomous systems, military applications of AI, and regional security. Austin's publications include a number of academic research articles and a book entitled “Exploring the Disruptive Implications of Lethal Autonomous Weapons Systems In Southeast Asia.”

INVITED PANELISTS

PANEL 1: *the AUKUS Partnership and Systems Interoperability* **Wednesday 29 November, afternoon** **chaired by Douglas Guilfoyle**

Dr Douglas Guilfoyle is Professor of International Law and Security at the University of New South Wales Canberra and will be the 2024 Lieber Scholar at West Point. His principal areas of research are maritime security, the international law of the sea, and international and transnational criminal law. Particular areas of specialism include maritime law-enforcement, the law of naval warfare, the prosecution of international crimes, and the history of international law. His research work is informed by his consultancy to various governments and international organisations. He is currently an Australian Research Council Future Fellow, working on the project “Small States’ use of law of the sea litigation against greater powers” (2022-2025). He is also a non-resident fellow at the Sea Power Centre - Australia, and is a former Visiting Legal Fellow at the Australian Department of Foreign Affairs and Trade (2018-2019). He was previously a Professor of Law at Monash University, Reader in Law at University College London, and has worked as a judicial associate in the Australian Federal Court and the Australian Administrative Appeals Tribunal. He has also practised as a commercial litigation solicitor in Sydney. He was a Gates Cambridge Trust scholar and Chevening scholar during his graduate study at the University of Cambridge.



Henri van Soest is an analyst at RAND Europe. His two main areas of focus are AI hardware governance and energy and natural resource governance. At RAND, he has managed studies involving global teams for a wide range of clients including the European Union, the UK government, and the Dutch government. He has also worked on energy policy, space logistics, cybersecurity, critical infrastructure protection, disaster risk reduction, and societal resilience. He previously worked as a researcher in energy policy and digitalisation at the University of Oslo, as an analyst in the cleantech startup sector, and as a corporate governance and corporate social responsibility analyst in a multinational bank. He completed his Ph.D.

at the University of Cambridge, with a thesis on the regulation of cybersecurity in the European electricity system. He also holds a joint LL.M. from KU Leuven in Belgium and the University of Zurich.

Elizabeth T. Williams is AUKUS Response Lead for the College of Engineering, Computing and Cybernetics at the Australian National University (ANU), a role which is mostly focused on figuring out how to ensure Australia continues to do its nuclear stewardship work well while simultaneously scaling up demand for workers with nuclear skills. She has a PhD in experimental nuclear structure from Yale University. Since joining the ANU in 2012, Liz has held an ARC DECRA Fellowship, worked extensively with accelerators, code, and superheavy elements, and explored complexity in real-world technological systems. She also led the creation of the hands-on half of the Masters of Applied Cybernetics, convenes the School of Cybernetics 2021 PhD cohort program, and is convenor of the newly created nuclear systems major and minor for the ANU School of Engineering.



Thursday 30 November, morning

PANEL 2: *Lethal Autonomous Weapons and Ethical attitudes*
Thursday 30 November, morning
chaired by Dr Max Cappuccio

Prof Deane-Peter Baker is Associate Professor of International and Political Studies in the School of Humanities and Social Sciences at the University of New South Wales (Canberra), and the author of *Morality and Ethics at War: Bridging the Gaps Between the Soldier and the State*. He was appointed to UNSW Canberra in August 2012. He came to Canberra from Annapolis, Maryland, USA, where he was an Assistant Professor of Ethics in the Department of Leadership, Ethics and Law at the United States Naval Academy for two and a half years. Prior to that Dr Baker was Associate Professor of Ethics at the University of KwaZulu-Natal in South Africa, where he taught for eleven years. His PhD, in philosophy, was awarded by Macquarie University. He is also a Senior Visiting Research Fellow in the Kings College London Centre for Military Ethics. He served as a panellist on the International Panel on the Regulation of Autonomous Weapons (IPRAW). His current area of focus is on ethics and special operations, and he is a regular consultant to Australia’s Special Operations Command. Recent publications include *Should We Ban Killer Robots?* (Polity Press 2022), *Morality and Ethics at War: Bridging the Gaps Between the Soldier and the State* (Bloomsbury Academic 2020) and *Citizen Killings: Liberalism, State Policy and Moral Risk* (Bloomsbury Academic 2016).



PANEL 3: *Asymmetric warfare and technology gaps*
Thursday 30 November, afternoon
chaired by Dr Austin Wyatt

Prof David Kilcullen is a former soldier and diplomat, and a scholar of guerrilla warfare, terrorism, urbanisation and the future of conflict, who served 25 years for the Australian and United States governments. During the Iraq War, he served in Baghdad as a member of the Joint Strategic Assessment Team, then as Senior Counterinsurgency Advisor, Multi-National Force Iraq in 2007, before becoming Special Advisor for Counterinsurgency to U.S. Secretary of State Condoleezza Rice in 2008. He was the U.S. State Department’s representative on the 2008 Lute Review of Afghanistan-Pakistan Strategy and was lead author for the U.S. Government’s Counterinsurgency Handbook. In Afghanistan, he founded the ISAF Counterinsurgency Advisory Assistance Team in 2009, served as advisor to Commander ISAF, and was a senior



research scientist on the Defense Advanced Research Projects Agency’s (DARPA) Afghanistan country program. Dr. Kilcullen has taught at universities and military colleges in the United States and Europe, making scholarly contributions to the theory of guerrilla warfare, insurgency and counterinsurgency, future conflict, human geography, urban studies, and fieldwork methods for conflict ethnography and remote observation. He is a distinguished graduate of the Australian Defence Force Academy, where he was awarded the 1987 Chief of Defence Force Prize for the top Army graduate, and of the Australian Command and Staff College, where won the 2001 Commander-in-Chief’s Sword for the top graduate from all services, and the Commander Australian Theatre Award for excellence in Joint Operations. He holds a Bachelor of Arts with Honours in Politics and English from the University of New South Wales, a Masters of Management from the University of Canberra, a Graduate Diploma in Linguistics from the Australian Defence Force School of Languages, and a Ph.D. from the University of New South Wales. Dr. Kilcullen was named one of the Foreign Policy Top 100 Global Thinkers in 2009. His books, *The Accidental Guerrilla* and *Counterinsurgency*, are used in several universities, as well as by policy-makers, the military, intelligence services and development agencies worldwide. His third book, *Out of the Mountains*, which examines conflict in the connected, coastal cities of the future, was awarded the 2013 American Publishers’ Association prize for Professional and Scholarly Excellence in Government and Politics. *Accidental Guerrilla* won the same prize in 2009 and was a Washington Post best-seller. His 2015 essay, *Blood Year: Terror and the Islamic State* won the 2015 Walkley Award for long-form writing, and was published as a full-length book in 2016 by Oxford University Press.

PANEL 4: Strategic Postures After the Rise of Autonomy
Friday 1 December, morning
chaired by Malcolm Davis



Travis Ellemans is Business Development Lead (Vehicles and Autonomous Systems) at Hanwha Defence Australia. Travis is an ex Air Force Electrical Engineer, with over 20 years experience covering aircraft maintenance, electronic warfare, airworthiness regulation and compliance, ISO 9001 management, airborne C2 and land based C2. Travis spent 7 years from 2010-2016 working on the Wedgetail program and was awarded a CAF gold commendation for his efforts in implementing IP Chat onto the platform, which was the key outstanding technical requirement for its first deployment as part of operation Okra. In his last role in uniform, he orchestrated the transition of the Air Force C2 system Vigilare from MSCT4 to Wakulda, an MSCT5 based system,

bringing Air Force into line with current United States C2 systems as a precursor to AIR6500 delivering the JBMS. Since leaving Air Force in 2018, Travis has worked in Defence industry on key focus areas of robotics and autonomy, C5 systems and guided weapons and is now the Business Development Lead for Hanwha Defence Australia.

WCDR Mike Moroney leads the Jericho team developing Delphi at Air Force Headquarters in Canberra. He was the program manager for CASG Next Generation Acquisition and Sustainment - CASG NX. In his role, he has proposed and implemented several Industry 4.0 initiatives for CASG including an approach to implementing AI at speed and scale known as Adaptive Collaboration and Augmented Intelligence (ACAI). ACAI is enabling the accelerated translation of DSTG research in fleet plan optimisation into the Defence Information Environment that is accessible by maintenance and engineering staff. Through this approach Mike and his team are pioneering the digital and organisational elements necessary to accelerate the pace at which research and products are adapted into digital systems that enhance Defence capability. Prior to his current role Mike has had several roles in Defence including deploying to Timor-Leste in 2011, Acquisition and Sustainment roles, Joint Logistics roles and managing the Reliability program of the Airborne Early Warning and Control Systems Program Office (AEWCSPPO).



PANEL 5: Policy and Governance of AI and Data
Friday 1 December, afternoon
chaired by Prof Gavin Mount



Dr Benjamin Boudreaux (*he/him*) is a professor at the Pardee RAND Graduate School and a policy researcher at RAND working in the intersection of ethics, emerging technology, and human security. His current research focuses on the ethics of artificial intelligence technologies, including issues related to equity, surveillance, and military applications of AI. He teaches Ethics in Theory, Policy, and Practice at Pardee RAND. Prior to joining RAND, Boudreaux was a diplomat in the State Department's Cyber Policy office, where he worked to promote security, stability, and human rights in cyberspace, and led State's cyber operations portfolio. Boudreaux also taught philosophical ethics and government to persons incarcerated at San Quentin state prison. Boudreaux holds a Ph.D. in philosophy from the University of California, Berkeley where he focused on ethical theory and political philosophy, a M.S. in foreign service from Georgetown University, and a B.A. in economics and philosophy from NYU.

Dr Andrew Lampert works in Palantir's global Privacy and Civil Liberties Engineering team, a multi-disciplinary team which works to design, build, and deploy privacy and civil liberties protective technologies, and to foster a culture of responsibility around their development and use. The team engages broadly across the company - from product engineering to internal governance and company leadership - as well as working with customers, academics, and other external stakeholders. Palantir prides itself on stepping in to make sure that critical institutions can do their jobs while also treating the protection of fundamental rights as essential requirements for our software. In doing so, we embrace the complexity of working in the real world and focus our work on solutions that address practical challenges. Our work is grounded in the belief that mission and protection of rights must both be delivered in developing and deploying technology. Prior to joining Palantir as part of the founding team in Australia, Andrew worked in natural language processing and artificial intelligence research for a decade at the CSIRO as well as in engineering roles in telecommunications and internet companies. Andrew has degrees in Software Engineering and Mathematics from the University of Melbourne, as well as a Masters degree in Speech and Language Processing and a PhD in Computational Linguistics, both from Macquarie University in Sydney.



CONFERENCE COORDINATOR AND ADVISORY BOARD CHAIR



Massimiliano (Max) Cappuccio is a Senior Researcher in the School of Engineering & Technology of University of New South Wales at Defence Force Academy, one of the founding member of UNSW AI Institute, a member of the Trusted Autonomy group, and the former Deputy-Director of the Values in Defence and Security Technology group. Max is a technology ethicist and a cognitive philosopher, with broad research interests spanning human performance (skill acquisition, skill disruption, accelerated training, effortless attention, etc.), human-machine interaction (soldier-robot teaming, social robots, assistive autonomous technologies), and philosophy & theory of AI. His research on intelligent systems and autonomous artificial

agents is interdisciplinary as it aims to integrate qualitative and quantitative method to the study of embodied and distributed cognition. His current research is sponsored by a Strategic Policy grant awarded by Australian Department of Defence and investigates how cultural factors affect the propensity of the armed forces of different nations in the Indo-pacific region to adopt autonomous weapon systems. His earlier work has dealt with the acceptance of killer robots, moral injury and military virtue, the frame problem of artificial intelligence, and anthropomorphic attributions in soldier-robot teams. During his career, he has produced more than a hundred original scientific contributions and has successfully coordinated several externally-funded research projects. He conducts an intense activity as an organizer of interdisciplinary workshops, research seminar series, and international conferences, such as the *TEMPER workshop on Training, Enhancement, and Military Performance*, the *LORA workshop on Autonomous, Connected, and Smart Transportation*, and the annual *Joint UAE Symposium on Social Robotics*.



**Make sure your voice is heard: participate in the online survey
“Cultural Attitudes toward Autonomous Technologies”**

<https://www.surveymonkey.com/r/ZZ57Y89>

You are invited to take part in our research study, which investigates the diversity of cultural attitudes towards Autonomous Systems in the Indo-Pacific region. The study intends to examine how these attitudes shape the degree to which technological innovation is embraced or resisted by individuals and organizations, including (but not limited to) the militaries of the Indo-Pacific region. The survey questions are divided in several sections. You don't need to answer all the questions: if you feel that you are unprepared to answer a question or group of questions, you can leave them blank.

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