BOND UNIVERSITY
TACTICAL RESEARCH UNIT

ANNUAL REPORT 2023

Tactical Research Unit

MISSION

To enhance the protection and performance of tactical personnel through pragmatic research, education, and advice.

VISION

Excellence in research that will lead to improvements in the health, wellbeing, and occupational performance of tactical personnel.

CONTENTS

1 1. Highlights and meeting the Bond University strategic direction for research
1.1. Highlights
1.2. TRU contribution toward the Bond University strategic direction for research

3 2. Centre Staff

5 3. Overview of Centre Activities for 2023
3.1. General
3.2. External Funding Review
3.3. Research Output Summary
3.4. Higher Degree Research and Doctor of Physiotherapy Students
3.5. Engagement with Academia, Government Organizations, and Industry
3.6. Specialist Courses Delivery

11 4. Research Impacts

12 5. Upcoming in 2024

12 6. Acknowledgements

Dr Elisa Canetti (far right) and HDR student Elizabeth Marsh (centre) reviews data from Ambulance Tasmania Wilderness Paramedics undergoing a water recovery task.

1. Highlights and meeting the Bond University strategic direction for research

1.1 Highlights

The year held several highlights including:

- hosting of the 4th International Physical Employment Standards (PES) conference at Bond
- hosting of the 3rd Rapid Fire Mini Congress during Research Week
- hosting guests from the Australian Army, Finnish Defence Forces and Canadian Special Operations, forging new research collaborations

Data collection and presentations for research saw travel to Tasmania, New South Wales, and Western Australia, and international trips to Singapore, Finland, and the USA squeezed in between intensive teaching by the TRU team across all three semesters.

The year saw the TRU staff, HDR students, and Doctor of Physiotherapy students presenting 15 abstracts at the Australian Physiotherapy Association conference and HDR student Colin Tomes submitted his thesis on Heart Rate Variability.

Notable success in translation of research to real-world impact was seen across several law enforcement agencies (impacting recruit assessments) and industries (thermal input into clothing designs).

Following a highly productive and impactful year, the support of key staff from the Doctor of Physiotherapy program, the Faculty of Health Sciences and Medicine, and Office of Research Services are gratefully acknowledged. Furthermore, invaluable industry support, especially from Australian Defence Apparel, and agency support, especially from the New South Wales Police Force and Department of Veterans' Affairs, saw the TRU able to achieve their goals and continue to progress work across the tactical field.

1.2 TRU contribution toward the Bond University strategic direction for research

Research conducted by the TRU has continued to support and advance Bond University's Strategic Plan 2023-2027. The following are contextualised against the four primary themes distilled from the strategic plans:

Distinctive and Connected: The TRU is indeed distinctive in Australia and internationally, being a research centre serving multiple tactical streams (military, law enforcement, fire and rescue, and paramedics), in a single university setting, with the sole research focus on these tactical occupations. The Unit's success has seen other micro adaptations of the TRU develop in the USA and UK with these institutions now collaborating with the TRU and, as such, expanding our reach to make a greater impact globally. Beyond just building collaborations, the TRU promotes connections amongst academics, industry, and end users internationally; an approach strengthened by our hosting of the 4th International Physical Employment Standards Conference in 2023.

The TRU's uniqueness is further highlighted by having a dedicated focus on education and training so as to foster an inspirational and aspiring learning community. This focus has led to the provision of training and professional development courses provided to Singapore, the USA, and New Zealand. Doctor of Physiotherapy students actively seek to continue engagement with the TRU as part of their learning journey, with many of these students remaining connected to the TRU and continuing to collaborate post-graduation as evidenced by publications and conference presentations continuing long past graduation. Furthermore, students from around the globe continue to seek out the TRU for their Higher Degree Research.

Relevant and Excellent: To ensure relevant and translational research, the TRU are constantly engaged and collaborating with industry and tactical organisations. This triangulated approach of academia, industry, and end-users has seen the TRU aid multiple industry partners in their product research and development and in responses to tenders from tactical organisations. Likewise, multiple national and international tactical organisations have specifically engaged with the TRU to test and evaluate industry products and standards and to assist in user trials and product down selection. These industries and organisations specifically seek out the TRU due to our known research excellence. The relevance of outcomes has guided industries to win tenders for their products and tactical organisations to change approaches to tactical assessment and training.

The TRU pursuit of excellence is typified by the philosophy of 'do more', providing outcomes above and beyond that expected. Through this approach, excellence in research and teaching service and quality, have been fostered leading to increasing national and international Requests For Information (RFI) from industry, government and state organisations, and end-users serving their respective nations and communities. The TRU and Bond University's unique identity and brand are further advanced across the globe through the TRU's numerous local, state, national and international conference presentations and speaker invitations, by ongoing publications in peer-reviewed international journals, and by their work with international law enforcement, military, and firefighter organisations and universities.

2. Centre Staff

DR ROB ORR – DIRECTOR, TRU

Director, Dr Rob Orr, leads the team and brings over 30 years of military experience to the TRU, having served in the Australian Regular Army for over two decades as an infantry soldier, physical training instructor, physiotherapist and human performance officer and now serving in the Army Reserves. Joining Bond University in 2012, his fields of research, consultancy, and education provision spans physical conditioning, reconditioning, rehabilitation and injury prevention for military, law enforcement and protective services across their occupational lifespan (initial trainee to specialist).

DR BEN SCHRAM – RESEARCH COORDINATOR

Dr Schram has a Bachelor of Exercise Science, Doctor of Physiotherapy and a PhD and is currently employed as an Assistant Professor at Bond University. He is the research and data coordinator for the Tactical Research Unit, where he conducts research with the military, police, and firefighters with a focus on injury identification and reduction strategies, validation of fitness standards, determining the physical demands of tactical occupations and ways to maximise performance within this population. He has been successful in obtaining almost $2 million dollars in research funding in a variety of tactical projects and has worked clinically as a physiotherapist for eight years.

DR. ELISA CANETTI - PROJECT COORDINATOR

Dr. Canetti is a Brazil-trained physiotherapist with a master's degree in high-performance science and a PhD in exercise immunology and iron metabolism. Dr Canetti is the TRU's general research project manager ensuring coordination of activities, providing high-level project support, and research expertise. Dr Canetti has over five years' experience teaching across multiple degrees at Bond University and is an experienced researcher in musculoskeletal conditions, immunology, and injury in female athletes, military, law enforcement, and fire and rescue personnel. Dr Canetti leads the TRU's research stream on the impact of stress and cognitive load in task performance and decision making by tactical populations.

DR. VINICIUS SIMAS - POST DOCTORAL RESEARCH FELLOW

Dr. Simas is a Sport and Exercise Physician, with clinical experience in injury prevention and rehabilitation, sports performance, and cardiopulmonary rehabilitation. He is a former member of the Brazilian Army Medical Corps, where he served as a cavalry lieutenant. Since 2015, Dr. Simas has been working in research and teaching at Bond University, where he completed his Ph.D. in Sport and Exercise Science. Dr. Simas has a strong passion for clinical and functional anatomy, focusing on the prevention of injuries and chronic diseases. He joined the TRU in 2020 as a Post-Doctoral Research Fellow.

ADMINISTRATIVE SUPPORT

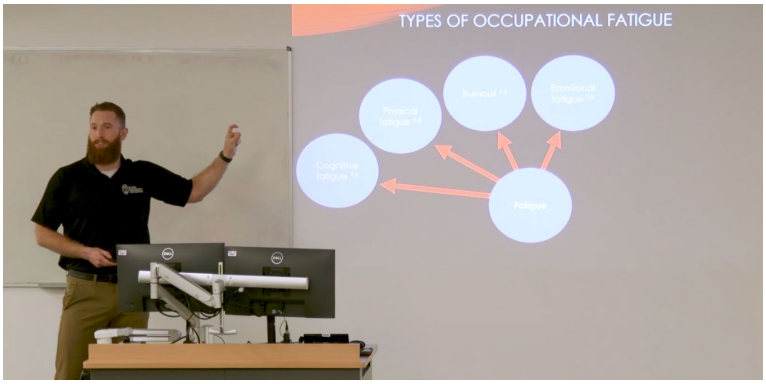
The TRU is supported by Sally Alexander and Michelle Hollands, who both have a long history of working for Bond University in an administrative capacity and bring a knowledge of all aspects of the University with them.

ADJ UNCTS AND RESEARCH ASSISTANTS

Several ongoing and highly successful adjunct relationships have persisted notably with Professor Rodney Pope (CSU), Dr Jay Dawes (Oklahoma State University) and Dr Robert Lockie (California State University – Fullerton). As part of TRU support and skill extension, several local and international HDR students continued to work with the unit as Research Assistants (RAs).

HDR Student Dustin Kidd, with Dr Ben Schram running through the protocols for the Australian Defence Apparel study.

HDR Student Graham Marvin presenting his work on fatigue at the 3rd TRU Rapid Fire Mini Congress during research week



3. Overview of Centre Activities for 2023

3.1 General

The 4th International Physical Employment Standards (PES) Conference

This three-day conference was attended by researchers, practitioners and policymakers working within the military, law enforcement, fire and rescue, paramedicine, astronautics, sport, and industry sectors from 10 nations. Four keynote presentations were delivered by esteemed presenters from Australia (Commissioner Georgeina Whelan, AM, CSC and Bar, Australian Capital Territory Emergency Services Agency and Dr Michael Drew, Assistant Secretary Health Protection and Policy, Department of Defence), the UK (COL Anne Fieldhouse, OBE, HQ Defence Medical Services), and Canada (Rachel Blacklock from Canadian Forces Morale and Welfare Services and Leslie Frei for the Royal Canadian Mounted Police). A total of 52 abstracts were presented as either a research podium (n=42) or ePoster (n=10) with abstracts spanning topics from the quantification of physical demands to uses of job task analyses and subsequent PES to quality assure physical and technical training, assessment, and rehabilitation. Three panel discussions on paramedics, the next generation of tactical trainees, and an 'interactive debate' on the value of physical employment standards, were held during the conference.

3rd TRU Rapid Fire Mini Congress

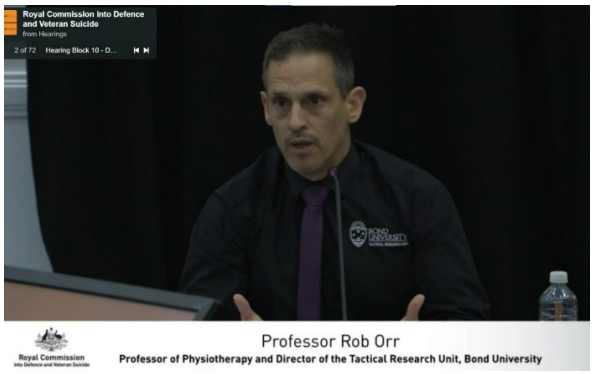
The Tactical Research Unit presented their 3rd Rapid Fire Mini Congress at Bond University's Research Week yesterday. Following a keynote from Dr Scotty Gayton on High Reliability Teams (HRT), HDR candidate Graham Marvin presented his work on Occupational Fatigue. The congress finished with 10 tactical research studies presented by the TRU team (Dr Elisa Canetti, Dr Ben Schram, and Dr Rob Orr) in 30 minutes in a Rapid Fire format (buzzer included). More information can be found here: https://lnkd.in/gDrHFKTG

Dr Scott Gayton presenting on high reliability teams at the 2023 TRU Rapid Fire Mini Congress

Snapshots

The TRU recently turned out in force to present at the Australian Physiotherapy Association IGNITE Conference in Brisbane. TRU staff, HDR students, and Doctor of Physiotherapy alumni students, presented work spanning military, law enforcement, fire and rescue and veterans conducted in Australia, Serbia and the USA. Overall the TRU presented 15 of the 19 original research abstracts forming part of the Occupational Health Stream.

Professor Rob Orr provided evidence to the Royal Commission Into Defence and Veteran Suicide giving evidence about his lived experience in Defence as well as present research on, injuries, injury management and the role of physical training and injury surveillance. More information about the Royal Commission can be found here: https://defenceveteransuicide.royalcommission.gov.au/system/files/2023-04/about-the-royal-commission-into-dvs-factsheet.PDF



Dr Elisa Canetti and Dr Ben Schram, together with HDR student Elizabeth Cooper, take a break from supporting Ambulance Tasmania Wilderness Paramedics. This trip, one of several, saw the TRU follow candidates completing an arduous wilderness Mountain Walk Assessment inclusive of sharp inclines and a scramble track, covering around 9km. While very cold, the view

Professor Rob Orr joined presenters from the UK, USA, and Finland to present research at the National Defence University in Finland. The session was attended by the Commandant of the University and over 100 Finish and Swedish military officer cadets.

3.2 External Funding Review

The TRU were awarded $35,000 in research funding in 2023 to investigate thermal effects of jungle clothing in a continued collaboration with Australian Defence Apparel (ADA). In addition, in-kind support was provided by Ambulance Tasmania Wilderness Paramedics, Queensland Police Service, and New South Wales Police Force providing staff and training events, venues, equipment, and consumables.

3.3 Research Output Summary

The TRU continued to ensure research outcomes were disseminated through a variety of mediums. The TRU focuses on ensuring that the research is accessible to target audiences, is published in a timely fashion, and students who completed work with the TRU are supported.

Over the 2023 period, the TRU:

- published 26 journal articles, with four of those published in conjunction with a PhD student, and one published in conjunction with Doctor of Physiotherapy students;
- produced 4 Technical Reports for national (Department of Veterans' Affairs (x 3)) and international (New Zealand Police Force (x 1)) agencies;
- presented a total of 34 conference presentations (both face-to-face and virtually); and
- disseminated research by several other outputs including television, radio interviews, magazine articles, informative blogs, and industry podcasts.
    - One podcast of note had 2LT Kirsten Franka reached out to the TRU asking for assistance in preparing for the gruelling BAATAN Memorial Death March after hearing podcast on conditioning for load carriage on MOPs & MOEs. The Death Match is a 26 mile march through the through the high desert terrain of the White Sands Missile Range conducted in honour of heroic US service members who defended the Philippine Islands during World War II. Dr Orr helped redesign 2LTs Franka's training program building on the evidence based research on military load carriage he had been conducting and refining at the TRU. Completing in the 'Heavy Division' (pack must weight a minimum of 35 pounds), 2LT Franka had the goal of finishing the gruelling event. Not only did SGT Franka finish the event 'feeling great' but she came 2nd in her age group and 5th overall in the Women's Heavy Division; an outstanding feat and proof that evidence based training works. The podcast can be found here: https://podcasts.apple.com/us/podcast/down-under-with-rob-orr-australian-army-human/id1618661938?i=1000578304982

For the full list of Publications in Peer Review Journals, conference presentations, and other activities, please see Appendix A.

Links:
https://tru.bond.edu.au/
https://www.linkedin.com/company/tactical-research-unit
https://www.facebook.com/TacticalResearchUnit
Documents: Appendix A - Publications and Presentations List 2023

3.4 Higher Degree Research and Doctor of Physiotherapy Students

Constituting 17% of the Faculty of Health Sciences and Medicine's HDR students, the TRU continues to balance teaching and research responsibilities with creating our next generation of tactical researchers. The TRU HDR projects sees collaboration with industries and government organisations to ultimately provide pragmatic impactful outcomes.

HDR Student Colin Tomes with members of a US Special Weapons and Tactics (SWAT) team following data capture.

Submitted in 2023:

1. Colin Tomes: Heart Rate Variability as a Human Performance Optimization Tool for the Tactical Professional

Ongoing for 2023:

1. Elizabeth Cooper: An Occupational Analysis of Wilderness Paramedics.
2. Holly Ranson: The influence of social norms on the occupational food choices of career firefighters.
3. Luke Meir: Effect of group based martial arts (Brazilian Jiu Jitsu) as an adjunct therapy for military veterans.
4. Kate Lyons: Musculoskeletal Injuries in Military Basic Training: Does Changing the Training Program Change the Injury Profile?
5. Jeremy Robinson: Identifying and optimising neuromuscular strength and power measures for Law Enforcement candidates
6. Darren Corea: The effects of a Virtual Reality based intervention on Chronic pain and anxiety in Veterans.
7. Nathan Andrews: Can competence achievability in law enforcement firearms training be defined and predicted.**
8. Graham Marvin: The relationship between sleep, training load, fatigue, and injury rate in emergency service workers.**
9. Mark Stephenson: Tactical performance under stress**
10. Sandra Adiarte: Eyes on the Target: Assessing and Training Tactical Personnel in Threat Assessment via Structured Behaviour Observation*
11. Joseph Dulla: Optimizing the Training Outcomes of Law Enforcement Recruits and Through Provision of an Evidence-based Physical Training Approach*
12. Dustin Kidd: A Comparison of Overt and Covert Body Armour*
13. Shane Irving: Occupational task and conditioning analysis in operational members of the Australian and New Zealand Police Tactical Groups*
14. Michael Stierli: Can workplace reconditioning improve the return to duty status and outcomes of the injured Police officer?*
15. Whitney Tramel: Subjective and objective measures of stress during activities related to tactical operator performance*

*** Completed their confirmation in 2023: * Confirmed*

International HDR Dissertation Committee

1. Jeff Paschall: Musculoskeletal Injuries in Pilots
2. Javair Gillett: The impact of a cognitive load delivered via smart glasses on handgun shooting performance in a variable environment.
3. Tristan Roy-Lanctot: Canadian Military veteran care, barriers and outcomes.

Non-HDR Student Supervision for Doctor of Physiotherapy Program

Evidence Based Practice Research (PHTY72-415 & 72-419)

- Daniel Hunter
- Jessica Chan
- Samir Zarrouki
- Ronney Chan
- Jasen Winny
- Hamza Ali
- Jordyn East
- Amy Martland
- Aunan Li
- Nolan Berner
- Louis Reilly
- Olaitan Oyebanji
- Curran Tse
- Marie Troja
- Samuel Wong
- Bec Ng
- Sarah Goble
- Emma Mchattan
- Chris Biilmann
- Thevanthi Thevanesan
- Abraham Ofosu
- Max Ackermann-Veron
- Abigail Brandon
- Shawn O'Halloran
- Mitch Welker
- Sophie Campling
- Grace Flynn

Doctor of Physiotherapy Conference Presentations

- Danielle Beranek
- Alexander Howe
- Claire Buttner
- Sharne-Louise Tiller
- Nash Vollenweider
- Olivia Pickard
- Catherine Pham
- Laura Ernst
- Vivian Talbot
- Ashlee Gersbach-Seib,
- Ryan Moore
- Troy Hamilton
- Gurjeet Gill
- Jayden Hutchinson
- Corey McKay,
- Samuel Hodkiewicz
- Tristan Bagley
- Jimmy Truong
- Alexander Kang

3.5 Engagement with Academia, Government Organisations, and Industry

There was a strong continuing engagement with academic colleagues from the United States, the United Kingdom, the United Arab Emirates, Germany, Serbia, Singapore, Brazil, South Africa, New Zealand, and the Islamic Republic of Iran with new collaborations in Ireland, Finland, Montenegro, Italy, and Bosnia and Herzegovina.

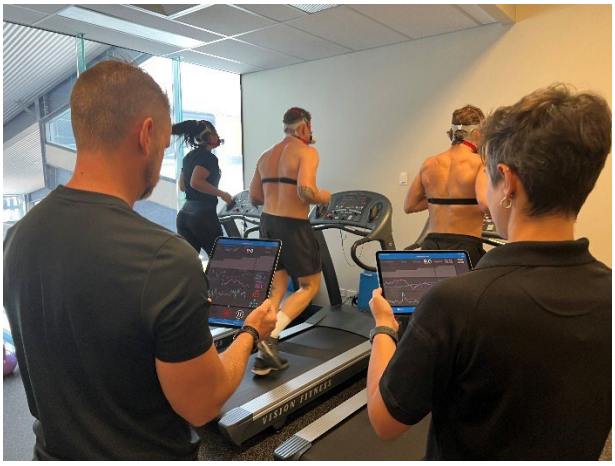
TRU national and international engagements

Working with Shane 'Buzz' Sarlin, the TRU reviewed the latest in body armour and camouflage netting and clothing from BuzzWorks. The work has led to a collaborative grant, 'The Integration of Remote and Autonomous Systems (RAS) into Operational Force Elements – a Model for Scalability to Balance the Focused Force',

Australian Army Warrant Office Physical Training Instructor Troy Perry and his staff visited the TRU to discuss the latest in research and research capability.

The TRU continued to work with the Translational Simulation Collaborative in investigating the impacts of stress in high performing teams and in their provision of the Teamwork and Collaborative Training (TACTical) Squad Training to enhance teamwork in trauma care. In addition, TRU's Dr Elisa Canetti was invited to speak at the Stress and Simulation Masterclass Workshop with Prof Victoria Brazil and Prof Vicki Leblanc (University of Ottawa). The workshop was part of Bond University's Simulation: Reconnect event, hosted by the Translational Simulation Collaborative.

Dr Ben Schram and Dr Elisa Canetti run testing sessions for Mixed Marital Arts fighters under the CMBT combatives program.



3.6 Specialist Courses Delivery

The TRU were invited to run a series of professional development sessions on physiotherapy treatment for tactical populations for the American Association of Sports Physical Therapists and the New Zealand Occupational Health Physiotherapy Group. The series consisted of three one-hour sessions covering the nature of tactical populations, common tasks and injuries, and the importance of fitness and rehabilitation.

Dr Rob Orr recently travelled back to Singapore to run the TRU's Tactical Conditioning Optimisation Program (TACOPS) course. The 3-day course was presented to approximately 30 Singapore Army Physical Training Master and Senior Fitness Leaders, and Physiotherapists. The course finished with a 60-minute physical conditioning session following which Dr Orr was presented with a Master Fitness Leader (MFL) badge for his work with the Soldier Fitness Centre over the last 8 years. The MFL qualification is the Singapore Army equivalent to Dr Orr's Australian Army qualification as an Advanced Course qualified, Physical Training Instructor.

4. Research Impacts

With a continued focus on translation of research to pragmatic outcomes, the TRU made many impacts upon industry and government departments throughout the year, with some notable contributions listed below:

- Tribunal and Legal Outcomes: The research of the TRU over the last several years has culminated in evidence given at the Royal Commission Into Defence and Veteran Suicide, support veteran Comcare claims, and support law enforcement court proceedings.

- New Zealand Police: A technical report compared the 2.4 km run to the 20m Multistage Fitness Test, generated of normative data for both, and assessed the reliability for the conduct of the 20m MSFT. Findings from this report allowed the NZ Police to apply an

evidence-based approach to their utilisation of these two assessments during their police recruit selection and training.

- Australian Defence Apparel: Ongoing work focussing on thermal impacts of light armour vests with ADA has seen further research being conducted in jungle clothing. More information can be found here: https://www.linkedin.com/feed/update/urn:li:activity:7097826860188762112/ In addition to this work, the collaboration with ADA supporting their Queensland Police Service (QPS) load bearing vest yielded an unexpected outcome when a recent incident saw a QPS police officer 'attacked' by an angry bull. The event saw the bull charge the office with horns lowered striking the officer in the chest. Luckily the officer was wearing one of the new ADA load bearing vests which was credited with saving the officer's life. Since this incident, and having heard of the TRUs involvement, a police agency in Texas, USA has reached out for support and further information on the testing undertaken by the TRU. For those interested the news story is here: New ILBV saves officer from angry bull in Qld's Southwest - Queensland Police News (mypolice.qld.gov.au)

5. Upcoming in 2024

Several major events are expected in 2024. The Commonwealth LAND 125-4 bid is expected to be announced in 2024 the outcomes of which may lead to several large and sustained contracts to provide research services to industry. The four year project for the Department of Veterans' Affairs is anticipated to culminate in 2024 further supporting the Royal Commission into Defence and Veteran Suicide. Staff will be presenting at the 45th International Congress on Military Medicine and National Strength and Conditioning Association Tactical Annual Training Conference with data capture planned with various policing and industry organisations around Australia and Europe.

6. Acknowledgements

The TRU would like to formally acknowledge several key personnel who have supported and enabled the unit during 2023

PHYSIOTHERAPY
Prof Wayne Hing
Prof Suzanne Gough

HSM
Prof Nick Zwar
Assoc. Prof Justin Keogh
Tanya Forbes
Rhonda Morton
Peter Marendy

ORS
Prof Keitha Dunstan
Director Andrew Calder
Haley Jacobi
Caroline Lovell
Elizabeth Gordon
Dr Lisa Marlow
Nino Murjikneli

2023 Publications Running List

PEER REVIEWED JOURNAL ARTICLES:

1. Schram, B., Kukić, F., Jankovic, R., Dimitrijević, R., Zigic, G., Orr, R. M., & Koropanovski, N. (2023). Effects of a single-day pre-academy physical test training session on physical fitness scores of police candidates. Work, 1-7.
2. Lockie, R. G., Orr, R. M., Kennedy, K., & Jay, D. (2023). Introduction of an applicant Job-Related Task Assessment (JTA) and the effects on the health and fitness of police recruits. Work, 1-13. Advance online publication.
3. Lockie, R. G., Orr, R. M., Montes, F., & Jay Dawes, J. (2023). Physical fitness test performance in firefighter trainees: Differences between graduated and released trainees and predicting academy graduation. Work, 1-13. Advance online publication.
4. Khoshakhlagh, A. H., Al Sulaie, S., Yazdanirad, S., Orr, R. M., Dehdarirad, H., & Milajerdi, A. (2023). Global prevalence and associated factors of sleep disorders and poor sleep quality among firefighters: A systematic review and meta-analysis. Heliyon, 9(2). https://doi.org/10.1016/j.heliyon.2023.e13250
5. Sanchez, K. J., Dawes, J., Stephenson, M. D., Orr, R. M., & Lockie, R. G. (2023). Resisting Arrest: Analysis of Different Prone Body Positions on Time to Stand and Engage. Journal of Criminalistics and Law, 37-48.
6. Thompson, M. B., Jeffers, J., Kukić, F., Lockie, R. G., Orr, R. M., & Jay, J. Povezanost Između Antropometrijskih I Mera Telesne Kompozicije Sa Ispoljavanjem Performansi Na Vojnom Fizičkom Testiranju Kod Muških I Ženskih Kadeta Rezervnog Vojnog Korpusa [Relationship Between Anthropometric And Body Measures Compositions With Exhibition Of Performance At A Military Physical Testing Of Male And Female Cadets Of The Military Reserve Corps]. SportLogia, 19 (1), 53-62. https://doi.org/10.7251/sgia.2319066t.se.jrm
7. Thompson, M. B., Lawson, D. J., Orr, R. M., Lockie, R. G., & Dawes, J. J. (2023). Relationships Between Anthropometric Measures and Body Composition with Individual ACFT Event Performance Among Army Reserve Officers' Training Corps Cadets. J Strength Cond Res 10-1519.
8. Marvin, G., Schram, B., Orr, R. & Canetti, E. (2023). Types and contributors to occupational fatigue. Strength Cond J. doi: 10.1519/SSC.0000000000000823
9. Marvin, G., Schram, B., Orr, R. & Canetti, E. (2023). Occupation-induced fatigue and impacts on emergency first responders: A systematic review. Int J Environ Res Public Health, 20(22). https://doi.org/10.3390/ijerph20227055
10. Tomes, C., Canetti, E., Schram, B. & Orr, R. (2023). Heart rate variability assessment of land navigation and load carriage activities in specialist police selection. Healthcare, 11(19). https://doi.org/10.3390/healthcare11192677
11. Gonzalez, S., Withrow, K., Rubin, D., Lynn, S., Dawes, J., Orr, R. & Lockie, R. (2023). A research note investigating the leg tuck and plank with potential impacts for occupational testing. J Strength Cond Res. doi: 10.1519/JSC.0000000000004566
12. Ferreira, D., Marins, E., Cavalcante, P., Simas, V., Canetti, E., Orr, R. & Vieira A. (2023). Identifying the most important, frequent, and physically demanding tasks of Brazilian firefighters. Ergonomics. doi: 10.1080/00140139.2023.2206072
13. Tramel, W., Schram, B., Canetti, E. & Orr, R. (2023). An examination of subjective and objective measures of stress in tactical populations: A scoping review. Healthcare, 11(18). https://doi.org/10.3390/healthcare11182515
14. Lockie, R., Orr, R., Montes, F. & Dawes, J. (2023). Change-of-direction speed in firefighter trainees: fitness relationships and implications for occupational performance. Journal of Human Kinetics. doi: 10.5114/jhk/161545

15. Johnson, Q., Kukić, F., Čvorović, A., Koropanovski, N., Orr, R., Lockie, R. & Dawes, J. (2023). Change of direction speed under two loading conditions among female police officers: Association with body morphology. Kinesiologia Slovenica, 29(2). DOI:https://doi.org/10.52165/kinsi.29.2.5-16
16. Brazil, V., Orr, R., Canetti, E., Isaacson, W., Stevenson, N. & Purdy, E. (2023). Exploring participant experience to optimize the design and delivery of stress exposure simulations in emergency medicine. AEM Education and Training. doi:10.1002/aet2.10852 https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/aet2.10852
17. Robinson, J., Micovic, M., Schram, B., Leroux, A., & Orr, R. M. (2023). The heart rates and movement speed of Specialist Tactical Police during a multistorey active shooter training scenario. Int J Exerc Sci, 16(4), 281-292. https://digitalcommons.wku.edu/ijes/vol16/iss4/7/
18. O'Shea, S., Pope, R., Freire, K., Orr, R. & Gallagher, N. (2023). Genitourinary infections in Australian servicewomen. Neurourology and Urodynamics 2023;42:1668-1675. doi:10.1002/nau.25252
19. Withrow, K.L., Rubin, D.A., Dawes, J.J., Orr, R.M., Lynn, S.K. & Lockie, R.G. (2023). Army combat fitness test relationships to tactical foot march performance in reserve officers' training corps cadets. Biology, 12(3), 477; https://doi.org/10.3390/biology12030477
20. Lockie, R., Orr, R., Montes, F., Ruvalcaba, T. & Dawes, J. (2023). Impact of physical fitness on reasons for academy release in firefighter trainees. J Strength Cond Res, 37(7), doi: 10.1519/JSC.0000000000004399
21. Johnson, Q. R., Scraper, J., Lockie, R., Orr, R. M., & Dawes, J. J. (2023). Sex-related differences in functional movement screen scores among reserve officers' training corps cadets. Military medicine, 188(1-2), e152-e157. https://academic.oup.com/milmed/article/188/1-2/e1/6101211
22. Dos Santos, M. L., Thompson, M., Dinyer-McNeely, T., Torrence, T., Lockie, R. G., Orr, R. M., & Dawes, J. J. (2023). Differences and relationships between push-up and sit-up variations among male law enforcement cadets. J Strength Cond Res, 37(9). DOI: 10.1519/JSC.0000000000004466
23. Campbell, P., Maupin, D., Lockie, R., Dawes, R., Simas, V., Canetti, E., Schram, B., & Orr, R. (2023). Evaluating the variability between 20-m multistage fitness test estimating equations in law enforcement recruits. J Strength Cond Res. doi: 10.1519/JSC.0000000000004389
24. Kukic, F., Jancovic, R., Dawes, J., Orr, R., & Koropanovski, N. (2023). Effects of Occupational load on the acceleration, change of direction speed and anaerobic power of police officers. J Strength Cond Res, 37(6). DOI: 10.1519/JSC.0000000000004426 https://journals.lww.com/nsca-jscr/Abstract/9900/Effects_of_Occupational_Load_on_the_Acceleration,.168.aspx
25. Orr, R., Canetti, E., Pope, R., Dawes, J., & Schram, B. (2023). Characterization of injuries suffered by mounted and non-mounted police officers. Int J Environ Res Public Health, 20(2). https://www.mdpi.com/1660-4601/20/2/1144
26. Lockie, R., Dawes, J. J., Sakura, T., Schram, B., & Orr, R. M. (2023). Relationships Between Physical Fitness Assessment Measures and a Workplace Task-Specific Physical Assessment Among Police Officers: A Retrospective Cohort Study. J Strength Cond Res, 37(3). https://doi.org/10.1519/JSC.0000000000004301

TECHNICAL REPORTS

1. Pope, R. Simas, V. Schram, B. Canetti, E. & Orr, R. (2023). Epidemiology of selected health conditions in Australian Defence Force personnel and veterans. Part 2: Sentinel Data. Tactical Research Unit, Bond University, Australia.
2. Pope, R. Simas, V. Schram, B. Canetti, E. & Orr, R. (2023). Epidemiology of selected health conditions in Australian Defence Force personnel and veterans. Part 1:DeHS Data. Tactical Research Unit, Bond University, Australia.

3. Pope. R., Canetti, E., Campbell, P., Simas, V., Schram, B., Fuller, G., & Orr, R. (2023). Occupational Exposures Among Trained ADF Personnel: A Survey. Tactical Research Unit, Bond University, Australia.
4. Orr, R., Canetti, E., Campbell, P., Simas, V. & Schram, B. (2023). A Review of the 2.4 mm and 20-M Shuttle Run Assessments For New Zealand Police. Tactical Research Unit, Bond University, Australia

SEMINARS, CONVENTIONS AND CONFERENCE PRESENTATIONS/POSTERS

1. Beranek, D., Howe, A., Campbell, P. & Canetti, E. (2023). The impact of prior physical conditioning in initial recruit training success: A systematic review. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
2. Buttner, P., Tiller, S., Vollenweider, N., Schram, B., Canetti, E. & Orr, R. (2023). Sex-specific differences in the impact of heavier body armour worn by law enforcement officers completing occupational tasks: a pilot study. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
3. Campbell, P., Pope, R., Simas, V., Canetti, E. Schram, B. & Orr, R. (2023). The incidence and risk factors for the development of fractures in military recruits and qualified personnel: A rapid review. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
4. Canetti, E., Schram, B. & Orr, R. (2023). Profiling the physical demands of mounted police during a major event. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
5. Canetti, E., Gill, G., Kang, A., Gough, S., Schram, B. & Orr, R. (2023). Ready student one: Simulation-based education, virtual reality, and the perception of stress. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
6. Ernst, L., Talbot, V., Schram, B., Orr, R. & Canetti, E. (2023). Effectiveness of physical conditioning practices for female military personnel. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
7. Hutchinson, J., McKay, C., Hodkiewicz, S., Schram, B., Canetti, E. & Orr, R. (2023). The physical fitness profiles of specialist policing teams. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
8. Orr, R., Schram, B., Pope, R., Neiderberger, B., Givens, A., Bernards, J. & Kelly, K. (2023). Gender differences in injuries sustained during United States Marine Corps training. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
9. Orr, R., Catherine, P., Hamilton, T., Canetti, E., Simas, V., Maupin, D. & Schram, B. (2023).Use of a load carriage assistance device for specialist police. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
10. Pickard, O., Orr, R., Schram, B., Canetti, E. & Pope, R. (2023). A comparison of musculoskeletal injuries in traffic and highway patrol officers and other officers. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
11. Schram, B., Orr, R., Neiderberger, B., Givens, A., Bernards, J. & Kelly, K. (2023). Differences in cardiovascular demand between male and female marines during progressive loaded hikes. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
12. Schram, B., Canetti, E. & Orr, R. (2023). Profiling the occupational tasks of traffic and highway patrol officers. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
13. Simas, V., Bagley, T., Truong, J., Schram, B., Canetti, E. & Orr, R. (2023). Impact of boots on task performance in tactical personnel: A systematic review. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023

14. Simas, V., Pope, R., Campbell, P., Canetti, E., Schram, B. & Orr, R. (2023). Internal derangement of the knee in physically demanding occupations: A rapid review. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
15. Tiller, S., Buttner, C., Vollenweider, N., Schram, B., Canetti, E. & Orr, R. (2023). Sex-specific differences in fit between two different types of body armour: A pilot study. Poster presented at the Australian Physiotherapy Association Conference, Brisbane, Australia, 5-7 October 2023
16. Orr, R. (2023). Killer Robots - Saviour or Menace? Bond University Community Seminar Series. Gold Coast, Australia, 13 July 2023
17. Orr, R., (2023). The Resistance Recipe for P/Re/Conditioning. The Global Summit – EndPJparalysis. International Online Conference. 12-13 July 2023.
18. Orr, R., Donohue, A., Purdy, E., Brazil, V. (2023). High Performing Teams - Capabilities and Cognitions. Turning Tides - Combined Medical Education, Communication, Leadership and Management and Wellbeing SIG Meeting 2023, Gold Coast, Australia, 23-25 June 2023
19. Orr, R. (2023). Physical Fitness Assessments & Evidence-Based Training in Tactical Populations. National Defence University. Helsinki, Finland, 29-30 March 2023
20. Orr, R. (2023). The Role of Physical Performance in Combat Readiness. 33rd Finnish Exercise Testing Symposium. Helsinki, Finland, 29-30 March 2023
21. Campbell, P., Pope, R., Simas, V., Canetti, E., Schram, B. & Orr, R.M. (2023). The Incidence and Risk Factors for the Development of Stress Fractures in Military Recruits and Qualified Personnel: A Rapid Review, Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
22. Campbell, P., Maupin, D., Lockie, R.G., Dawes, J.J., Simas, V., Canetti, E., Schram, B. & Orr, R.M. (2023). The Development of Normative Fitness Data and Analysing the Relationships Between 20MSFT and 2.4-Km Run Performance in Australian Police Recruits, Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
23. Canetti, E.F.D., Gersbach-Seib, A., Moore, R., Schram, B. & Orr, R.M. (2023). A profile of occupational tasks performed by mounted police officers. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
24. Dulla, J., Lockie, R., Schram, B. & Orr, R. (2023). Relationships and Predictive Capabilities of Two Different Applicant Test Batteries with Performance in a Job-Specific Physical Ability Exit Examination in Law Enforcement Recruits. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
25. Dulla, J., Lockie, R., Schram, B. & Orr, R. (2023). Profile of Two Different Applicant Test Batteries with Regards to Sex and Age in Successful Law Enforcement Applicants. Abstract presented at the 4th International Physical Employment Standards Conference, 24-26 February 2023
26. Orr, R., Niederberger, B., Givens, A., Bernards, J. & Kelly, K. (2023). Injuries Following Implementation of a Progressive Load Carriage Program in United States Marine Corps Training. Abstract presented at the 4th International Physical Employment Standards Conference, 24-26 February 2023
27. Lockie, R., Orr, R.M., Montes, F. & Dawes, J.J. (2023). Predicting Academy Graduation in Firefighter Trainees via Fitness Testing. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
28. Lockie, R.G., Orr, R.M., Kennedy, K. & Dawes, J.J. (2023). Introduction of an Applicant Job-Related Task Assessment and the Effects on the Health and Fitness of Police Recruits. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
29. Maupin, D., Canetti, E.F.D., Schram, B., Dulla, J., Lockie, R.G., Dawes, J.J. & Orr, R.M. (2023). Law Enforcement Recruit Fitness Changes across the Fitness Spectrum. Abstract presented at the

4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023

30. Orr, R.M., Canetti, E.F.D. & Schram, B. (2023). A Comparison Of Two Law Enforcement Marksmanship Assessments. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
31. Orr, R.M., Maupin, D., Canetti, E.F.D. & Schram, B. (2023). Performance variations between 3 different backpack systems: A Pilot Study Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
32. Koropanovski, N., Janković, R., Dimidtrijević, R., Žigić,, G., Schram, B., Orr, R.M. & Kukic, F. (2023). Effects of a Single-Day Pre-Academy Physical Test Education Session on Physical Fitness Scores of Police Candidates. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
33. Schram, B., Orr, R.M. & Pope, R. (2023). A profile of injuries suffered by female soldiers serving in the Australian Army. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023
34. Tomes, C., Canetti, E.F.D., Schram, B. Orr, R.M. (2023). Heart Rate Variability Profile Changes Associated with Sleep, Less-lethal Explosive Device Exposure, and Fear of Heights Training in Specialist Police Selection. Abstract presented at the 4th International Physical Employment Standards Conference, Gold Coast, Australia, 24-26 February 2023

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In the spirit of reconciliation, Bond University acknowledges the Kombumerri people, the traditional Owners and Custodians of the land on which the University now stands. We pay respect to Elders past, present and emerging.

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