



Fires are now wicked problems

Key Topics:

- fire [2]
- fire impacts [3]
- fire severity [4]

Threshold conditions for extreme fire behaviour [5]

This study is identifying the thresholds beyond which dynamic fire behaviour becomes a dominant factor, the effects that these dynamic effects have on the overall power output of a fire, and the impacts that such dynamic effects have on fire severity. This will necessarily include consideration of other factors such as how fine fuel moisture varies across a landscape. The research team is investigating the conditions and processes under which bushfire behaviour undergoes major transitions, including fire convection and plume dynamics, evaluating the consequences of eruptive fire behaviour (spotting, convection driven wind damage, rapid fire spread) and determining the combination of conditions for such behaviours to occur (unstable atmosphere, fuel properties and weather conditions).

## Project: detail Notabs

### Research team

#### Research leader

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<div></div> <div> <b>Dr Stuart Matthews</b>            [35]            END-USER         </div> <div>   <b>NSW RURAL FIRE SERVICE</b> </div> <div>[35]</div> <div>[17]</div>	<div></div> <div> <b>Tim Wells</b>            [36]            END-USER         </div> <div></div> <div>[36]</div> <div>[30]</div>
<div>[34]</div> <div></div> <div> <b>Dr Simon Heemstra</b>            [34]            END-USER         </div> <div>   <b>NSW RURAL FIRE SERVICE</b> </div> <div>[17]</div>	

## Description

While a number of advances have been made in understanding bushfire development under extreme conditions, these have not been quantified in a manner that is suitable for inclusion in fire behaviour modelling framework. This project aims to develop statistical models that allow for the inclusion of dynamic effects when they are important – that is, when fires grow sufficiently large and complex.

The study is identifying the thresholds beyond which dynamic fire behaviour becomes a dominant factor, the effects that these dynamic effects have on the overall power output of a fire, and the impacts that such dynamic effects have on fire severity. This will necessarily include consideration of other factors such as how fine fuel moisture varies across a landscape.

The research team is investigating the conditions and processes under which bushfire behaviour undergoes major transitions, including fire convection and plume dynamics, evaluating the consequences of eruptive fire behaviour (spotting, convection driven wind damage, rapid fire spread) and determining the combination of conditions for such behaviours to occur (unstable atmosphere, fuel properties and weather conditions).

There are three overlapping research activities:

1. Collating fire behaviour observations - creating a database of observations of extreme fire behaviour to use in model development and verification, working with government agencies to develop reconstructions of past fires.
2. Understanding extreme fire weather and fire behaviour - determining the thresholds in fire and environmental conditions (weather, fuel, topography) that lead to extreme fire phenomena, such as fire tornados and ember storms.
3. Factors linked to extreme fire behaviour - developing simple statistical equations to represent dynamic fire phenomena that can be integrated into existing fire-behaviour models.

It is expected that both the research and operational management communities will benefit by greatly improving knowledge of extreme bushfires. Currently, there is limited information with which to develop new models or test theories about extreme fire behaviour.

This project will create new observational datasets of such fires and use them to describe empirical relationships between fire phenomena and the key environmental conditions that drive them. These relationships could be incorporated into existing fire simulation systems and generate further research, including the verification of physics-based models and the development of new theories of fire propagation.

The research will be utilised through the development of guidelines for identifying environmental conditions causing the extreme fire behaviour phenomena during operational fire behaviour analysis and improved fire behaviour simulators through the inclusion of extreme fire behaviours.

These outputs will result in improved prediction of fire behaviour at the point where damage to property and loss of life is more likely. Improved predictions will improve the knowledge base of fire managers and their ability to make informed decisions during fires and about landscape vulnerability. This will include improving the efficiency and safety of fire suppression activities, better targeting of public information and warnings, and an improved understanding of the potential effectiveness strategies for managing landscape fire risk.

## Related News



29 JAN 2021

How heatwaves and drought combine to produce the perfect firestorm  
FIRE, FIRE SEVERITY

[37]



28 JAN 2021

Australia Day Honours for CRC experts  
FIRE, FIRE IMPACTS

[38]



28 JAN 2021

New online - January 2021  
COMMUNICATION, EMERGENCY MANAGEMENT

[39]



15 DEC 2020

New online - December 2020  
COMMUNICATION, EMERGENCY MANAGEMENT

[40]





International awards for CRC experts  
FIRE IMPACTS, FIRE WEATHER

09 DEC 2020

[41]



New online - November 2020  
COMMUNICATION, EMERGENCY MANAGEMENT

16 NOV 2020

[42]



08 OCT 2020

CRC researchers recognised as science leaders  
EMERGENCY MANAGEMENT, HYDROLOGY

[43]



22 JUL 2020

New online - July 2020  
COMMUNICATION, EMERGENCY MANAGEMENT

[44]



New online - May 2020  
COMMUNICATION, EMERGENCY MANAGEMENT

21 MAY 2020

[45]



CRC science making national impact  
FIRE, FIRE SEVERITY

19 NOV 2019

[46]





Predictive services research spotlighted  
EMERGENCY MANAGEMENT, FORECASTING

23 OCT 2019

[47]



New online - October 2019  
EMERGENCY MANAGEMENT, ENGINEERING

09 OCT 2019

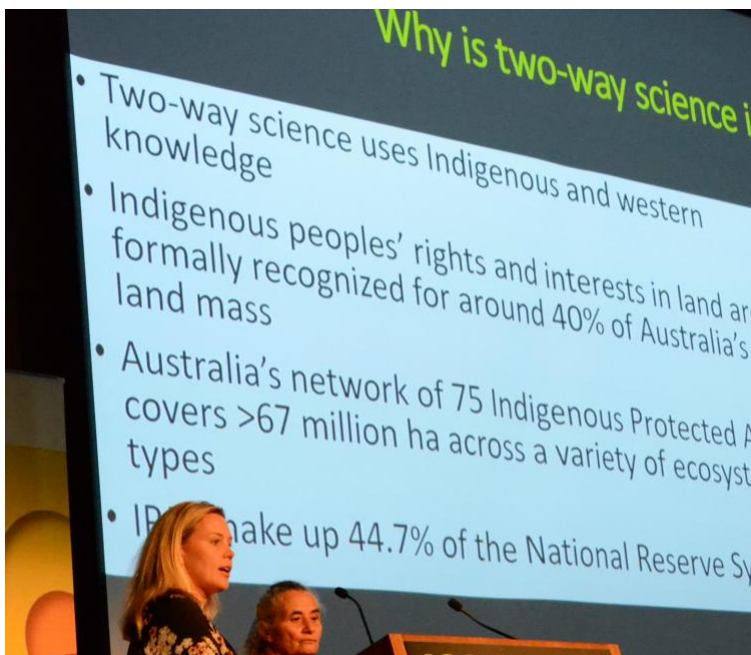
[48]



11 SEP 2019

New online - September 2019  
EMERGENCY MANAGEMENT, MULTI-HAZARD

[49]



15 MAY 2019

Global fire focus on diversity, cultural burning and communities  
COMMUNITIES, DIVERSITY AND INCLUSION

[50]



Prescribed burning research warm up to conference  
FORECASTING, MITIGATION

15 MAY 2019

[51]



New online – November 2018  
EARTHQUAKE, MODELLING

15 NOV 2018

[52]





New online - September 2018  
EMERGENCY MANAGEMENT, INDIGENOUS COMMUNITIES

19 SEP 2018

[53]



Conference papers available online  
EMERGENCY MANAGEMENT, MULTI-HAZARD

18 SEP 2018

[54]





New online - March 2018  
EMERGENCY MANAGEMENT, MULTI-HAZARD

14 MAR 2018

[55]



New online - November 2017

17 NOV 2017

[56]



New online - August 2016

16 AUG 2016

[57]



Fire expertise honoured  
FIRE, MODELLING

19 APR 2016

[58]



Researcher awarded Queen's Birthday Honour

10 JUN 2015

[59]



Mercury rising replay available  
COMMUNITIES, FIRE SEVERITY













07 OCT 2014

[60]

Publications

Year	Type	Citation
2022	Book Chapter	Filkov, A. [9], Cawson, J. [61], Swan, M. [62] & Penman, T. [8] <i>Handbook of Fire and the Environment The Society of Fire Protection Engineers Series</i> , (Springer, 2022). DOI [63] Google Scholar [64]
2022	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour - final project report</a> [67]. (Bushfire and Natural Hazards CRC, 2022). Google Scholar [68] E
2021	Conference Paper	Filkov, A. [9] <a href="#">Predicting merging fire behaviour in Planned Burning</a> [71]. <i>AFAC21</i> (AFAC, 2021). at <https://www.afac.com.au/events/proceedings/05-10-21/article/predicting-merging-fire-behaviour-i
2020	Journal Article	Cawson, J. [61] <i>et al.</i> <a href="#">Exploring the key drivers of forest flammability in wet eucalypt forests using expert-derived conceptual models</a> [76]. <i>Landscape Ecology</i> <b>35</b> , 1775–1798 (2020). DOI [77] G
2020	Journal Article	Filkov, A. [9], Ngo, T. [81], Matthews, S. [35], Telfer, S. [82] & Penman, T. [8] <a href="#">Impact of Australia's catastrophic 2019/20 bushfire season on communities and environment. Retrospective analys</a>
2020	Journal Article	Burton, J. [88], Cawson, J. [61], Filkov, A. [9] & Penman, T. [8] <a href="#">Leaf traits predict global patterns in the structure and flammability of forest litter beds</a> [89]. <i>Journal of Ecology</i> (2020). doi:https://do
2020	Journal Article	Prohanov, S. [94], Filkov, A. [9], Kasymov, D. P. [95], Agafontsev, M. [96] & Reyno, V. [97] <a href="#">Determination of Firebrand Characteristics Using Thermal Videos</a> [98]. <i>Fire 3</i> , (2020). DOI [99] Google Sc
2020	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour - annual report 2019-2020</a> [103]. (Bushfire and Natural Hazards CRC, 2020). Google Schola
2019	Conference Paper	Filkov, A. [9], Cirulis, B. [107] & Penman, T. [8] <a href="#">Quantifying dynamic fire behaviour phenomena using Unmanned Aerial Vehicle technology</a> [108]. <i>23rd International Congress on Modelling and Si</i>
2019	Journal Article	Penman, T. [8] & Cirulis, B. [107] <a href="#">Cost effectiveness of fire management strategies in southern Australia</a> [113]. <i>International Journal of Wildland Fire</i> <b>29</b> , 427-439 (2019). DOI [114] Google Scholar
2019	Journal Article	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Frequency of Dynamic Fire Behaviours in Australian Forest Environments</a> [118]. <i>Fire 3</i> , (2019). DOI [119] Google Scholar [120] BibTeX [121] EndNote X
2019	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme bushfire behaviour annual report 2018-2019</a> [123]. (Bushfire and Natural Hazards CRC, 2019). Google Sci
2019	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining Threshold Conditions for Extreme Fire Behaviour Annual Report 2017-2018</a> [127]. (Bushfire and Natural Hazards CRC, 2019). Google Scho
2018	Conference Paper	Bates, J. [131] <a href="#">Research proceedings from the 2018 Bushfire and Natural Hazards CRC and AFAC Conference</a> [132]. <i>Bushfire and Natural Hazards CRC &amp; AFAC annual conference 2017</i> (Bushfir
2018	Conference Paper	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Extreme fire behaviours: Surveying fire management staff to determine behaviour frequencies and importance</a> [136]. <i>AFAC18</i> (Bushfire and Natural H
2018	Journal Article	Filkov, A. [9] & Prohanov, S. [94] <a href="#">Particle tracking and detection software for firebrands characterization in wildland fires</a> [140]. <i>Fire Technology</i> <b>55</b> , 817-836 (2018). DOI [141] Google Scholar [14
2018	Journal Article	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Improving Fire Behaviour Data Obtained from Wildfires</a> [145]. <i>Forests</i> <b>9</b> , (2018). DOI [146] Google Scholar [147] BibTeX [148] EndNote XML [149]
2018	Journal Article	Read, N. [150], Duff, T. [6] & Taylor, P. [151] <a href="#">A lightning-caused wildfire ignition forecasting model for operational use</a> [152]. <i>Agricultural and Forest Meteorology</i> <b>253-254</b> , 16 (2018). DOI [153] Go
2018	Journal Article	Matvienko, O. V. [157], Kasymov, D. P. [95], Filkov, A. [9], Daneyko, O. I. [158] & Gorbатов, D. A. [159] <a href="#">Simulation of fuel bed ignition by wildland firebrands</a> [160]. <i>International Journal of Wildland f</i>
2018	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour</a> [164]. (Bushfire and Natural Hazards CRC, 2018). Google Scholar [165] BibTeX [166] EndN
2017	Journal Article	Mueller, E. [168] <i>et al.</i> <a href="#">Utilization of remote sensing techniques for the quantification of fire behavior in two pine stands</a> [169]. <i>Fire Safety Journal</i> <b>91</b> , 845-854 (2017). DOI [170] Google Scholar [
2017	Journal Article	Fateev, V. [174], Agafontsev, M. [96], Volkov, S. [175] & Filkov, A. [9] <a href="#">Determination of smoldering time and thermal characteristics of firebrands under laboratory conditions</a> [176]. <i>Fire Safety J</i>
2017	Journal Article	Filkov, A. [9] <i>et al.</i> <a href="#">Investigation of firebrand production during prescribed fires conducted in a pine forest</a> [181]. <i>Proceedings of the Combustion Institute</i> <b>36</b> , 3270 (2017). DOI [182] Google Scho
2017	Journal Article	Thomas, J. [186] <i>et al.</i> <a href="#">Investigation of firebrand generation from an experimental fire: development of a reliable data collection methodology</a> [187]. <i>Fire Safety Journal</i> <b>91</b> , 864-871 (2017). DOI
2017	Report	Filkov, A. [9], Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour: annual project report 2016-17</a> [192]. (Bushfire and Natural Hazards CRC, 2017). Google S
2016	Conference Paper	Tolhurst, K. G. [196] & McCarthy, G. J. [197] <a href="#">Effect of prescribed burning on wildfire severity - a landscape case study from the 2003 fires in Victoria</a> [198]. <i>AFAC16</i> (Bushfire and Natural Hazarc
2016	Report	Duff, T. [6], Penman, T. [8] & Filkov, A. [9] <a href="#">Determining threshold conditions for extreme fire behaviour: Annual project report 2015-2016</a> [202]. (Bushfire and Natural Hazards CRC, 2016). Google
2015	Presentation	Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour</a> [206]. (2015). Google Scholar [207] BibTeX [208] EndNote XML [209]
2015	Report	Duff, T. [6] & Penman, T. [8] <a href="#">Determining threshold conditions for extreme fire behaviour: Annual project report 2014-2015</a> [210]. (Bushfire and Natural Hazards CRC, 2015). Google Scholar [211]

## Presentations & Resources

DATE	TITLE	[215]	DOWNLOAD	KEY TOPICS
27 Oct 2014	Environmental thresholds for dynamic fire propagation	[216]		fire [2], propagation [217]
04 Dec 2014	Threshold conditions for extreme fire behaviour	[218]	 610.43 KB	[218] (610.43 KB) fire severity [4], modelling [220]
22 Mar 2016	Severe and High Impact Weather - cluster overview	[221]	 0 bytes	[222] (0 bytes) modelling [220], scenario analysis [223]
24 Oct 2016	Determining threshold conditions for extreme fire behaviour	[224]	 1.88 MB	[225] (1.88 MB) fire [2], mitigation [226], severe weather [227]
25 Oct 2016	Next generation fire modelling	[228]	 1.35 MB	[229] (1.35 MB) fire [2], fire severity [4], fire weather [230]
07 Jul 2017	Building bushfire predictive services capability	[231]	 9.97 MB	[232] (9.97 MB) fire [2], fire weather [230], modelling [220]
07 Jul 2017	Building bushfire predictive services capability - Simon Heemstra	[233]	 0 bytes	[234] (0 bytes) fire [2], fire impacts [3], modelling [220]
31 Oct 2017	Determining threshold conditions for extreme fire behaviour: standardising data obtained from wildfires	[235]	 567.23 KB	[236] (567.23 KB) fire [2], fire impacts [3], fire severity [4]
19 Sep 2018	The development of a pyrocumulonimbus prediction tool	[237]	 2.01 MB	[238] (2.01 MB) fire [2], fire severity [4]
23 Nov 2018	Determining threshold conditions for extreme fire behaviour	[239]	 868.87 KB	[240] (868.87 KB) fire [2], fire impacts [3]
18 Jun 2019	Interactions between climate, vegetation and fuel	[241]	 3.16 MB	[242] (3.16 MB) fire [2], fire impacts [3], fire weather [230], severe weather [243]
17 Oct 2019	Thresholds for dynamic fire behaviours	[244]	 5.88 MB	[245] (5.88 MB) fire [2], fire severity [4]
01 Dec 2020	PHOENIX RapidFire	[246]		fire [2], fire impacts [3], fire severity [4]
18 Feb 2022	Understanding what happens when bushfires merge	[247]	 1.28 MB	[248] (1.28 MB) fire [2], fire impacts [3], fire severity [4]

## Posters

## Context

Buildable management systems making decisions about complex issues that involve people with many different backgrounds and organizations with many different objectives, values, and interests. Building a management system involves determining what actions to take in an effort to achieve the most value for all stakeholders. This involves determining what actions are proposed to play a role in a formal system, identify the stakeholders who will be affected by the system, and trade off the interests of different stakeholders in the trade-off of alternative objectives (such as financial, safety, health, and environment).



## Objective

The goal of this project is to develop a set of risk metrics to be derived from risk management tools for the 2015-16 management. These metrics need to be able to address the requests of PMO/IO/IR/IO/IR.

## Metrics

Category	Sub-category
Financial	Revenue
Operational	Efficiency
Customer	Satisfaction
Human Resources	Retention
Environment	Carbon Footprint
Health & Safety	Incident Rate
Compliance	Audit Score
Technology	System Uptime
Legal	Litigation Costs
Reputation	Brand Value
Supply Chain	Material Sourcing
Research & Development	Innovation Pipeline
Marketing	Lead Generation
Production	Quality Control
Distribution	Logistics Efficiency
Customer Support	Response Time
Partnerships	Strategic Alliances
Government Relations	Regulatory Compliance
Community Engagement	CSR Initiatives
Employee Well-being	Diversity & Inclusion
Environmental Impact	Waste Reduction
Social Impact	Community Development
Political Impact	Policy Advocacy
Economic Impact	Job Creation
Cultural Impact	Heritage Preservation
Technological Innovation	R&D Investment
Artistic Innovation	Creative Output
Scientific Innovation	Patent Filings
Medical Innovation	Drug Development
Space Exploration	Launch Success
Artificial Intelligence	Algorithm Accuracy
Blockchain Technology	Transaction Volume
Quantum Computing	Qubit Stability
Nanotechnology	Material Strength
Biotechnology	Genome Sequencing
Autonomous Vehicles	Accident Rate
Drone Technology	Flight Duration
Robotics	Task Completion Rate
Augmented Reality	User Engagement
Virtual Reality	Immersive Experience
Cloud Computing	Storage Capacity
Big Data Analytics	Data Processing Speed
Internet of Things	Device Connectivity
Wearable Devices	Sensor Accuracy
Smart Home Technology	Automation Efficiency
Smart City Solutions	Infrastructure Resilience
Smart Agriculture	Yield Optimization
Smart Manufacturing	Production Efficiency
Smart Transportation	Traffic Congestion
Smart Energy	Renewable Energy Adoption
Smart Healthcare	Telemedicine Usage
Smart Education	Online Learning Engagement
Smart Retail	Personalized Shopping Experience
Smart Entertainment	Content Consumption
Smart Security	Cybersecurity Breaches
Smart Infrastructure	Infrastructure Maintenance
Smart Urban Planning	Urban Density
Smart Environmental Monitoring	Air Quality Index
Smart Disaster Preparedness	Emergency Response Time
Smart Governance	Public Service Efficiency
Smart Social Services	Welfare Program Reach
Smart Cultural Heritage	Heritage Site Preservation
Smart Language Learning	Language Proficiency
Smart Music Creation	Music Production Quality
Smart Film Production	Film Production Budget
Smart Journalism	Journalism Integrity
Smart Publishing	Book Sales Volume
Smart Gaming	Gameplay Engagement
Smart Sports Management	Sports Team Performance
Smart Event Management	Event Attendance
Smart Hospitality	Hotel Guest Satisfaction
Smart Travel Services	Travel Itinerary Customization
Smart Food & Beverage	Food Safety Compliance
Smart Fashion Design	Fashion Design Innovation
Smart Fashion Retail	Fashion Retail Sales
Smart Fashion Marketing	Fashion Marketing Campaigns
Smart Fashion Production	Fashion Production Efficiency
Smart Fashion Distribution	Fashion Distribution Network
Smart Fashion Customer Support	Fashion Customer Support Response Time
Smart Fashion Sustainability	Fashion Sustainability Initiatives
Smart Fashion Social Impact	Fashion Social Impact Initiatives
Smart Fashion Environmental Impact	Fashion Environmental Impact Initiatives
Smart Fashion Political Impact	Fashion Political Impact Initiatives
Smart Fashion Economic Impact	Fashion Economic Impact Initiatives
Smart Fashion Cultural Impact	Fashion Cultural Impact Initiatives
Smart Fashion Technological Impact	Fashion Technological Impact Initiatives
Smart Fashion Artistic Impact	Fashion Artistic Impact Initiatives
Smart Fashion Scientific Impact	Fashion Scientific Impact Initiatives
Smart Fashion Medical Impact	Fashion Medical Impact Initiatives
Smart Fashion Space Exploration Impact	Fashion Space Exploration Impact Initiatives
Smart Fashion Artificial Intelligence Impact	Fashion Artificial Intelligence Impact Initiatives
Smart Fashion Blockchain Technology Impact	Fashion Blockchain Technology Impact Initiatives
Smart Fashion Nanotechnology Impact	Fashion Nanotechnology Impact Initiatives
Smart Fashion Biotechnology Impact	Fashion Biotechnology Impact Initiatives
Smart Fashion Autonomous Vehicles Impact	Fashion Autonomous Vehicles Impact Initiatives
Smart Fashion Drone Technology Impact	Fashion Drone Technology Impact Initiatives
Smart Fashion Robotics Impact	Fashion Robotics Impact Initiatives
Smart Fashion Augmented Reality Impact	Fashion Augmented Reality Impact Initiatives
Smart Fashion Virtual Reality Impact	Fashion Virtual Reality Impact Initiatives
Smart Fashion Cloud Computing Impact	Fashion Cloud Computing Impact Initiatives
Smart Fashion Big Data Analytics Impact	Fashion Big Data Analytics Impact Initiatives
Smart Fashion Internet of Things Impact	Fashion Internet of Things Impact Initiatives
Smart Fashion Wearable Devices Impact	Fashion Wearable Devices Impact Initiatives
Smart Fashion Smart Home Technology Impact	Fashion Smart Home Technology Impact Initiatives
Smart Fashion Smart City Solutions Impact	Fashion Smart City Solutions Impact Initiatives
Smart Fashion Smart Agriculture Impact	Fashion Smart Agriculture Impact Initiatives
Smart Fashion Smart Manufacturing Impact	Fashion Smart Manufacturing Impact Initiatives
Smart Fashion Smart Transportation Impact	Fashion Smart Transportation Impact Initiatives
Smart Fashion Smart Energy Impact	Fashion Smart Energy Impact Initiatives
Smart Fashion Smart Healthcare Impact	Fashion Smart Healthcare Impact Initiatives
Smart Fashion Smart Education Impact	Fashion Smart Education Impact Initiatives
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Smart Fashion Smart Entertainment Impact	Fashion Smart Entertainment Impact Initiatives
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Smart Fashion Smart Urban Planning Impact	Fashion Smart Urban Planning Impact Initiatives
Smart Fashion Smart Environmental Monitoring Impact	Fashion Smart Environmental Monitoring Impact Initiatives
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Smart Fashion Smart Travel Services Impact	Fashion Smart Travel Services Impact Initiatives
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Smart Fashion Smart Fashion Distribution Impact	Fashion Smart Fashion Distribution Impact Initiatives
Smart Fashion Smart Fashion Customer Support Impact	Fashion Smart Fashion Customer Support Impact Initiatives
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Smart Fashion Smart Fashion Environmental Impact Impact	Fashion

Determining threshold conditions for extreme fire behaviour [249]



The bushfire behaviour and management group of the University of Melbourne is conducting a project to...



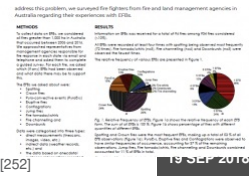
[250] Severe fire behaviour – improved planning responses

[250] This project aims to better describe the nature of bushfires, especially very severe ones, and the effect of...



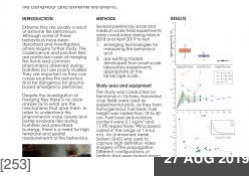
[251] Developing wildfire risk metrics in Phoenix RapidFire

[251] Bushfire management involves making decisions about complex issues that involve people, communities,...



[252] Extreme fire behaviours: Surveying fire management staff to determine behaviour frequencies and importance

Extreme fire behaviours (EFBs) are phenomena that occur within intense fires that have been shown to...



[253] Using advancements in technology for better understanding of fire behaviour and decision making

[253] DECISION MAKING [254]



[255] Flammability of live plants, do we need a new testing approach?

[255] FIRE [2], FIRE WEATHER [230]

Key findings: The validity of using dynamic heating regimes and VHFflux apparatus as a standardised method has...

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**Through the flames - quantitative analysis of strategic and tactical wildfire suppression**  
[256]  
BUSHFIRE PREDICTIVE SERVICES [257]  
Dr Greg Penney  
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[258]

**Threshold conditions for extreme fire behaviour**  
[5]  
BUSHFIRE PREDICTIVE SERVICES [257]  
A/Prof Trent Penman  
University of Melbourne [7]



[7]

Fire coalescence and mass spotfire dynamics  
[259]

BUSHFIRE PREDICTIVE SERVICES [257]

Prof Jason Sharples  
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[11]

Fire spread prediction across fuel types  
[260]

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[261]

Coupled fire-atmosphere modelling  
[262]

SEVERE AND HIGH IMPACT WEATHER [263]

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[19]

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http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Determining%2Bthreshold%2Bconditions%2Bfor%2Bextreme%2Bfire%2Bbehaviour%2B-%2Bannual%2Breport%2B2019-2020%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [101] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/7499 [106] https://www.bnhcrc.com.au/publications/biblio/export/xml/7499 [107] https://www.bnhcrc.com.au/people/bcirulis [108] https://www.bnhcrc.com.au/publications/biblio/bnh-6549 [109] https://www.researchgate.net/publication/338412609\_Quantifying\_dynamic\_fire\_behaviour\_phenomena\_using\_Unmanned\_Aerial\_Vehicle\_technology [110] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Quantifying%2Bdynamic%2Bfire%2Bbehaviour%2Bphenomena%2Busing%2BUnmanned%2BAerial%2BVehicle%2Btechnology%2B-%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [111] 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http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Frequency%2Bof%2Bdynamic%2Bfire%2Bbehaviours%2Bin%2BAustralian%2BForest%2BEnvironments%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [121] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/6393 [122] https://www.bnhcrc.com.au/publications/biblio/export/xml/6393 [123] https://www.bnhcrc.com.au/publications/biblio/bnh-5830 [124] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Determining%2Bthreshold%2Bconditions%2Bfor%2Bextreme%2Bfire%2Bbehaviour%2B-%2Bannual%2Breport%2B2018-2019%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [125] https://www.bnhcrc.com.au/publications/biblio/export/xml/5830 [127] https://www.bnhcrc.com.au/publications/biblio/bnh-5424 [128] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Determining%2Bthreshold%2Bconditions%2Bfor%2Bextreme%2Bfire%2Bbehaviour%2B-%2Bannual%2Breport%2B2017-2018%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [129] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/5424 [130] https://www.bnhcrc.com.au/publications/biblio/export/xml/5424 [131] https://www.bnhcrc.com.au/people/john-bates [132] https://www.bnhcrc.com.au/publications/researchproceedings2018 [133] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Research%2Bproceedings%2Bfrom%2Bthe%2B2018%2BBushfire%2Bband%2BNatural%2BHazards%2BCRC%2Bband%2BAFAC%2BConference%22&as\_sauthors=Bates&as\_occt=any [134] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/4739 [135] https://www.bnhcrc.com.au/publications/biblio/export/xml/4739 [136] https://www.bnhcrc.com.au/publications/biblio/bnh-4743 [137] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Extreme%2Bfire%2Bbehaviours%2BA%2BSurveying%2Bfire%2Bmanagement%2Bstaff%2Bto%2Bdetermine%2Bbehaviour%2Bfrequencies%2Bband%2Bimportance%22&as\_sauthors= [138] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/4743 [139] https://www.bnhcrc.com.au/publications/biblio/export/xml/4743 [140] https://www.bnhcrc.com.au/publications/biblio/bnh-6037 [141] http://dx.doi.org/10.1007/s10694-018-0805-0 [142] http://scholar.google.com/scholar?btnG=Search%2BScholar&as\_q=%22Particle%2Btracking%2Bband%2Bdetection%2Bsoftware%2Bfor%2Bfirebrands%2Bcharacterization%2Bin%2Bwildland%2Bfires%22&as\_sauthors=Filkov&as\_occt=any&as\_epq=&as\_oq=&as\_eq=&as\_publication=&as\_ylo=&as\_yhi=&as\_sdtAAP=1&as\_sdp=1 [143] https://www.bnhcrc.com.au/publications/biblio/export/bibtex/6037 [144] https://www.bnhcrc.com.au/publications/biblio/export/xml/6037 [145] https://www.bnhcrc.com.au/publications/biblio/bnh-4458 [146]

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[http://scholar.google.com/scholar?btnG=Search%2BScholar&as\\_q=%22Determining%2Bthreshold%2Bconditions%2Bfor%2Bextreme%2Bfire%2Bbehaviour%22&as\\_sauthors=Filkov&as\\_occt=any&as\\_epq=&as\\_oq=&as\\_eq=&as\\_publication=&as\\_ylo=&as\\_yhi=&as\\_sd=1476](http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Determining%2Bthreshold%2Bconditions%2Bfor%2Bextreme%2Bfire%2Bbehaviour%22&as_sauthors=Filkov&as_occt=any&as_epq=&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sd=1476) [166] <https://www.bnhrcr.com.au/publications/biblio/export/bibtex/4998> [167] <https://www.bnhrcr.com.au/publications/biblio/export/xml/4998> [168] <https://www.bnhrcr.com.au/publications/biblio?%5D=1476> [169] <https://www.bnhrcr.com.au/publications/biblio/bnh-5182> [170] <http://dx.doi.org/10.1016/j.fireasf.2017.03.076> [171] [http://scholar.google.com/scholar?btnG=Search%2BScholar&as\\_q=%22Utilization%2Bof%2Bremote%2Bsensing%2Btechniques%2Bfor%2Bthe%2Bquantification%2Bof%2Bfire%2Bbehaviour%2Bin%2Btwo%2Bpine%2Bstands%22&as\\_sauthors=Muellera&as\\_oq=&as\\_eq=&as\\_publication=&as\\_ylo=&as\\_yhi=&as\\_sd=1476](http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Utilization%2Bof%2Bremote%2Bsensing%2Btechniques%2Bfor%2Bthe%2Bquantification%2Bof%2Bfire%2Bbehaviour%2Bin%2Btwo%2Bpine%2Bstands%22&as_sauthors=Muellera&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sd=1476) [172] <https://www.bnhrcr.com.au/publications/biblio/export/bibtex/5182> [173] <https://www.bnhrcr.com.au/publications/biblio/export/xml/5182> [174] <https://www.bnhrcr.com.au/publications/biblio?%5D=1476> [175] <https://www.bnhrcr.com.au/publications/biblio?%5D=1489> [176] <https://www.bnhrcr.com.au/publications/biblio/bnh-5141> [177] <http://dx.doi.org/10.1016/j.fireasf.2017.03.080> [178] [http://scholar.google.com/scholar?btnG=Search%2BScholar&as\\_q=%22Determination%2Bof%2Bsmoldering%2Btime%2Band%2Bcharacteristics%2Bof%2Bfirebrands%2Bunder%2Blaboratory%2Bconditions%22&as\\_sauthors=Fateev&as\\_oq=&as\\_eq=&as\\_publication=&as\\_ylo=&as\\_yhi=&as\\_sd=1479](http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Determination%2Bof%2Bsmoldering%2Btime%2Band%2Bcharacteristics%2Bof%2Bfirebrands%2Bunder%2Blaboratory%2Bconditions%22&as_sauthors=Fateev&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sd=1479) [179] <https://www.bnhrcr.com.au/publications/biblio/export/bibtex/5141> [180] <https://www.bnhrcr.com.au/publications/biblio/export/xml/5141> [181] <https://www.bnhrcr.com.au/publications/biblio/bnh-5140> [182] <http://dx.doi.org/10.1016/j.proci.2016.06.125> [183] [http://scholar.google.com/scholar?btnG=Search%2BScholar&as\\_q=%22Investigation%2Bof%2Bfirebrand%2Bproduction%2Bduring%2Bprescribed%2Bfires%2Bconducted%2Bin%2Ba%2Bpine%2Bforest%22&as\\_sauthors=Filkov&as\\_occt=any&as\\_epq=&as\\_oq=&as\\_eq=&as\\_publication=&as\\_ylo=&as\\_yhi=&as\\_sd=1479](http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Investigation%2Bof%2Bfirebrand%2Bproduction%2Bduring%2Bprescribed%2Bfires%2Bconducted%2Bin%2Ba%2Bpine%2Bforest%22&as_sauthors=Filkov&as_occt=any&as_epq=&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sd=1479) [184] <https://www.bnhrcr.com.au/publications/biblio/export/bibtex/5140> [185] <https://www.bnhrcr.com.au/publications/biblio/export/xml/5140> [186] <https://www.bnhrcr.com.au/publications/biblio?%5D=1479> [187] <https://www.bnhrcr.com.au/publications/biblio/bnh-5183> [188] <http://dx.doi.org/10.1016/j.fireasf.2017.04.002> [189] [http://scholar.google.com/scholar?btnG=Search%2BScholar&as\\_q=%22Investigation%2Bof%2Bfirebrand%2B](http://scholar.google.com/scholar?btnG=Search%2BScholar&as_q=%22Investigation%2Bof%2Bfirebrand%2Bgeneration%2Bfrom%2Ban%2Bexperimental%2Bfire%3A%2Bdevelopment%2Bof%2Ba%2Bliable%2Bdata%2Bcollection%2Bmethodology%22&as_sauthors=Filkov&as_occt=any&as_epq=&as_oq=&as_eq=&as_publication=&as_ylo=&as_yhi=&as_sd=1479)