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IVAN CHARLES HANIGAN.  
Curriculum Vitae.  
November 4, 2013.

Appointments ***Australian National University***

2013–Present. Part-time Data Analyst, Fenner School of Environment and Society. Long-Term Ecosystem Research Network and Australian Supersite Network Analytical software developments.

***CSIRO Adaptive Primary Industries***

2013–Present. Part-time data analysis projects investigating characteristics of transformational adaptation in a) Energy use and b) Farm Enterprise Mix.

***James Cook University***

2013. Part-time Research Data Scientist assisting the Terrestrial Ecosystem Research Network's Australian Supersite Network online data portal and Analytical software developments.

***University of Canberra***

2013–Present. Part-time Research Assistant to Professor Colin Butler, Faculty of Health.

***Australian National University***

2008–Present. Data Manager and Analyst, National Centre for Epidemiology and Population Health (NCEPH).

2008–2009. Data Analyst, Environment, Climate and Health (NCEPH).

***University of Tasmania***

2008–2011. Data Manager and Analyst, Bushfire Smoke, Heatwaves and Health Project, School of Plant Science.

***Charles Darwin University***

2006–2007. Data Manager and Analyst, Bushfire Smoke and Health Project, School of Environmental Research.

***Australian National University***

2001–2006. Research Assistant Environmental Epidemiology Group (NCEPH).

Education

***Australian National University***

2009–Present: Part-time PhD entitled *Disentangling Health Effects of Environmental Change from Social Factors*, NCEPH and CSIRO.

Panel: Colin Butler, Philip Kokic, Rohan Nelson, Steven McEachern.

1998–2005: Bachelor of Arts in Geography and Human Ecology, First Class Honours, School of Resources, Environment and Society. ANU.

## Papers

- A18. Wilson LA, Morgan GG, **Hanigan IC**, Johnston FH, Abu-Rayya H, Broome R, Gaskin C, Jalaludin, B. *The impact of heat on mortality and morbidity in the Greater Metropolitan Sydney Region: A case crossover analysis*. Accepted Environmental Health 24 October 2013.
- A17. Martin KL, **Hanigan, IC**, Morgan GG, Henderson SB, Johnston FH. *Air pollution from bushfires and their association with hospital admissions in Sydney, Newcastle and Wollongong, Australia 1994–2007*. Australian New Zealand Journal of Public Health. 2013;37(238-43). doi: 10.1111/1753-6405.12065.
- A16. Johnston FH, **Hanigan IC**, SB Henderson and Morgan GG. *Effect of air pollution control on death rates in Launceston, Australia, 1994–2007: an Intervention study*. BMJ 2013;345(e8446). doi: 10.1136/bmj.e8446
- A15. **Hanigan IC**, Butler CD, Kovic PN and Hutchinson MF. *Suicide and drought in New South Wales, Australia, 1970–2007*. Proceedings of the National Academy of Science USA 2012;109(35). doi: 10.1073/pnas.1112965109.
- A14. Vally H, Peel M, Dowse GK, Cameron S, Codde JP, **Hanigan IC** and Lindsay MD. *Geographic Information Systems used to describe the link between the risk of Ross River virus infection and proximity to the Leschenault estuary, WA*. Australian and New Zealand Journal of Public Health 2012;36(3). doi:10.1111/j.1753-6405.2012.00869.x
- A13. Johnston FH, **Hanigan IC**, Henderson SB, Morgan, GG and Bowman, DMJS. *Extreme air pollution events from bushfires and dust storms and their association with mortality in Sydney, Australia 1994–2007*. Environmental Research 2011;111(6). doi:10.1016/j.envres.2011.05.007
- A12. Johnston FH, **Hanigan IC**, Henderson SB, Morgan GG, Portner T, Williamson GJ and Bowman DMJS. *Creating an integrated historical record of extreme particulate air pollution events in Australian cities from 1994 to 2007*. Journal of the Air and Waste Management Association 2011;61(4). doi:10.3155/1047-3289.61.4.390
- A11. Hall GV, **Hanigan IC**, Dear KBG and Vally H. *The influence of weather on community gastroenteritis in Australia*. Epidemiology and Infection 2011;139(6). doi:10.1017/S0950268810001901
- A10. Edwards F, Dixon J, Friel S, Hall G, Larsen K, Lockie S, Wood B, Lawrence M, **Hanigan IC**, Hogan A and Hattersley L. *Climate change adaptation at the intersection of food and health*. Asia-Pacific Journal of Public Health 2011;23(2). doi:10.1177/1010539510392361

- A9. Bambrick H, Woodruff R and **Hanigan IC**. *Climate change could threaten blood supply by altering the distribution of vector-borne disease: an Australian case-study*. Global Health Action 2009;2. doi:10.3402/gha.v2i0.2059
- A8. Johnston FH, **Hanigan IC** and Bowman DMJS. *Pollen loads and allergic rhinitis in Darwin, Australia: A potential health outcome of the grass-fire cycle*. Ecohealth 2009;6(1). doi: 10.1007/s10393-009-0225-1
- A7. **Hanigan IC**, Johnston FH and Morgan GG. *Vegetation fire smoke, indigenous status and cardio-respiratory hospital admissions in Darwin, Australia, 1996-2005*. Environmental Health 2008;7(42). doi:10.1186/1476-069X-7-42
- A6. **Hanigan IC** and Johnston FH. *Respiratory hospital admissions were associated with ambient airborne pollen in Darwin, Australia, 2004-2005*. Clinical and Experimental Allergy 2007;37(10). doi:10.1111/j.1365-2222.2007.02800.x
- A5. Johnston FH, Bailie RS, Pilotto LS and **Hanigan IC**. *Ambient biomass smoke and cardio-respiratory hospital admissions in Darwin, Australia*. BMC Public Health 2007;7(1). doi:10.1186/1471-2458-7-240
- A4. D'Souza RM, Bambrick H, Kjellstrom T, Kelsall L, Guest C and **Hanigan IC**. *Seasonal variation in acute hospital admissions and emergency room presentations among children in the ACT*. Journal of Paediatrics and Child Health 2007;43(5). doi:10.1111/j.1440-1754.2007.01080.x
- A3. Dear KBG, Ranmuthugala G, Kjellstrom T, Skinner C and **Hanigan IC**. *Effects of temperature and ozone on daily mortality experienced in France during the August 2003 heat wave*. Archives of Environmental and Occupational Health 2006;60(4). PMID:17214291
- A2. **Hanigan IC**, Hall GV and Dear KBG. *A comparison of methods for calculating population exposure estimates of daily weather for health research*. International Journal of Health Geographics 2006;5(1). doi:10.1186/1476-072X-5-38
- A1. Nicholls N, Butler C and **Hanigan IC**. *Inter-annual rainfall variations and suicide in New South Wales, Australia, 1964-2001*. International Journal of Biometeorology 2006;50(3). doi:10.1007/s00484-005-0002-y
- Manuscripts  
Submitted B1. O'Brien LV, Berry HL, Coleman C and **Hanigan IC**. *Drought as a mental health exposure*. Submitted to Environmental Research on 15th May 2013.

Data Publi-  
cations

- C3. <http://researchdata.ands.org.au/meteorological-data-for-australian-postal-areas>
- C2. <http://researchdata.ands.org.au/weather-exposures-by-statistical-local-area-sla-2001-edition>
- C1. <http://researchdata.ands.org.au/monthly-drought-data-for-australia-1890-2008-using-the-hutchinson-drought-index>

Published  
Abstracts

- D3. **Hanigan IC**, Johnston FH, Morgan GG, Dingle JK and Bowman DMJS. *Assessing the Relationship Between Exposure to Vegetation Fire Smoke and Hospital Admissions when Empirical Air Quality Measurements are Limited: Darwin, Australia, 1996-2005*. Epidemiology 2008;19(6) Supplement:S266 [ISEE 2008 Conference Abstracts Supplement]
- D2. D'Souza RM, Becker NG, Hall G, Kjellstrom T, Bambrick H, Kelsall L, **Hanigan IC** and Guest C. *Climatic factors associated with hospitalisations and emergency room presentations for diarrhoea in children*. Epidemiology 2005;16(5):S60 [ISEE 2005 Conference Abstracts Supplement].
- D1. D'Souza RM, Becker NG, Kjellstrom T, Bambrick H, Woodruff R, Kelsall L, **Hanigan IC** and Guest C. *Influence of climatic factors on hospitalisations and emergency room presentations for asthma and other (non-asthma) respiratory conditions in children*. Epidemiology 2005;16(5):S50 [ISEE 2005 Conference Abstracts Supplement].

Reports Au-  
thored

- E6. Bambrick H, Woodruff R and **Hanigan IC**. *Effective emissions targets needed to protect Australia's blood supply*. The Australia Institute Policy Brief No. 11 2010
- E5. McMichael AJ, Berry H, Butler C, Capon A, Dear KBG, **Hanigan IC**, Harley DO, Kjellstrom T, Lucas R and Strazdins L. 2009. *Assessing the scale and nature of health vulnerability to climate change*. Background report for Campbell-Lendrum D and Bertollini R, Protecting health from climate change: global research priorities. World Health Organisation, Geneva.
- E4. Bambrick H, Dear KBG, Woodruff R, **Hanigan IC** and McMichael AJ. *The impacts of climate change on three health outcomes: temperature-related mortality and hospitalisations, salmonellosis and other bacterial gastroenteritis, and population at risk from dengue*. Garnaut Climate Change Review, Commonwealth of Australia 2008.

- E3. Berry H, Kelly B, **Hanigan IC**, Coates J, McMichael AJ, Welsh J and Kjellstrom T. *Rural mental health impacts of climate change*. Garnaut Climate Change Review 2008.
- E2. D'Souza RM, Hennessy K, Cope M, McMichael AJ, Page C, Whetton P, Physick B and **Hanigan IC**. *A scoping study of the impact of climate change on air pollution over Sydney*. Consultancy for NSW Environmental Protection Agency. 2003.
- E1. **Hanigan IC**. *Hotspots of Pathogens in Drinking Water Catchments: Case Study of Googong Catchment*. ECOWISE Environmental Pty. Ltd. and ActewAGL, Canberra. 2003.

Reports As-  
sisted

- F2. Woodruff R, Hales S, Butler CD, and McMichael AJ. *Climate Change Health Impacts In Australia: Effects of Dramatic CO2 Emission Reductions*. Report for the Australian Conservation Foundation and the Australian Medical Association. 2005.
- F1. McMichael AJ, Woodruff R, Whetton P, Hennessy KJ, Nicholls N, Hales S, Woodward A, and Kjellstrom T. *Human Health and Climate Change in Oceania: a Risk Assessment*. Commonwealth Department of Health and Aging Australia. 2003.

Conference  
Posters and  
Presenta-  
tions

- G24. **Hanigan IC**. Climate Change Health Impact Assessments: Farmer Suicide and Drought Case Study. Presented to Staff of the Food Security Programme, MS Swaminathan Research Foundation. October 4, 2013, Chennai, India.
- G23. **Hanigan IC**. Disentangle Environmental from Social Factors: Suicide and Climate Case Study. Presented to Staff of SNEHA (WHO) Suicide Prevention Centre. October 3, 2013, Chennai, India.
- G22. Butler CD, Turner GM, **Hanigan IC** and Bowles DC. Climate Change Adaptation: A Mirage That Threatens To Trap Us In Dry Sand. GREENHOUSE 2013 The Science Of Climate Change. October 10, 2013, Adelaide.
- G21. Johnston FH, **Hanigan IC**, Henderson SB and Morgan GG. Biomass Smoke Pollution And Mortality Rates In Launceston, Australia, 1994-2007: Evaluation Of Coordinated Interventions To Improve Ambient Air Quality. The joint ISEE, ISES and ISIAQ Environmental Health Conference 2013 in Basel, Switzerland (19-23 August 2013).

- G20. Morgan GG, Martin KL, **Hanigan, IC**, Henderson SB, Johnston FH. Wood Smoke PM10 and Hospital Admissions in Seven Regional Australian Towns. The joint ISEE, ISES and ISIAQ Environmental Health Conference 2013 in Basel, Switzerland (19-23 August 2013).
- G19. **Hanigan IC**, Fisher D and McEachern S. Open Software for Restricted Data: a Climate/Suicide Health Impact Assessment Example. Speedtalk and Poster. National Climate Change Adaptation Research Facility Conference 'Climate Adaptation knowledge and partnership'. June 2013, Sydney.
- G18. Bennett CM, **Hanigan IC**, Dear KBG, Szarka I. A SWISH Way to Assess the Health Impacts of Climate Change. NCCARF Conference 'Climate Adaptation: Knowledge And Partnerships'. June 2013, Sydney.
- G17. Howden M, Bates B, Crimp S, **Hanigan IC**, Australian Drought Strategies: From Providence To Pigeon-Holing To Preparedness And People. High Level Meeting on National Drought Policy (HMNDP) organised by WMO, FAO, and UNCCD. Geneva, March 2013.
- G16. Harley DO, Dear KBG, Faddy H, **Hanigan IC**, Lindesay J, McMichael AJ, Ritchie S, Viennet E, Williams C. Dengue transmission under climate change in Northern Australia: linking ecological and population-based models to develop adaptive strategies. Communicable Diseases Control Conference and ASID Annual Scientific Meeting. Canberra, 19-23 March 2013. [Oral]
- G15. Johnston FH, **Hanigan IC**, Henderson SB, Morgan GG and Bowman, DMJS. *The association between mortality and air pollution events from bushfires and dust storms in Sydney, 1994-2007*. Royal College of Physicians Annual Scientific Meeting, Darwin, 2011. [Poster]
- G14. Morgan G, **Hanigan IC**, Wilson L, Abu-Rayya H, Gaskin C, Johnston F, Lloyd G, Broome R, and Jalaludin B. *The effects of heat waves on mortality and hospitalisation in Sydney, Australia 1994-2009*. 23th Congress of the International Society for Environmental Epidemiology, Barcelona, 2011. [Poster].
- G13. Johnston FH, **Hanigan IC**, Henderson SB, Morgan GG and Bowman DMJS. *Preliminary results from the Australian landscape fire smoke project*. International Society for Environmental Epidemiology, Annual Scientific Meeting, Seoul Korea Sept 2010. [Poster]
- G12. Bambrick H, Dear KBG and **Hanigan IC**. *Deaths in a sunburnt country: Differential mortality responses to temperatures in a 'hot' country*.

IOP Conference Series Earth and Environmental Science, 6 142013, 2009. [Poster]

- G11. Banwell C, Dixon J, Bambrick H, Hinde S, Kjellstrom T, Lucas R and **Hanigan IC**. *Socio-cultural reflections on comfort and heat in Australia with implications for climate change adaptation*. IOP Conference Series Earth and Environmental Science, 6 572023, 2009. [Poster]
- G10. Johnston FH and **Hanigan IC**. *Tropical plant pollens and allergic rhinitis*. The Thoracic Society of Australia and New Zealand Annual Scientific Meeting. Darwin, 6-7 April 2009. [Poster]
- G9. McMichael AJ and **Hanigan IC**. *Drought and drying: The human dimension. Risks to Wellbeing and Health. Drought – Past and Future*. ANU Water Initiative. ANU, Canberra. Nov 14, 2008. [Oral]
- G8. **Hanigan IC**, Johnston FH, Morgan GG, Dingle JK and Bowman DMJS. *Assessing the relationship between exposure to vegetation fire smoke and hospital admissions when empirical air quality measurements are limited: Darwin, Australia, 1996-2005*. Joint Annual Conference of the International Society for Environmental Epidemiology and International Society of Exposure Analysis. Pasadena, California, Oct 2008. [Oral]
- G7. **Hanigan IC** and Nicholls N. *Geo-coded Australian meteorological data: sources, content, uses*. Climate Change And Health Short Course: Research and policy issues in relation to health impacts and adaptations. Australian National University, Canberra. 4-6 December 2007. [Oral]
- G6. Johnston FH, **Hanigan IC** and Morgan GG. *Vegetation fire smoke, indigenous status and cardio-respiratory hospital admissions in Darwin, Australia, 1996-2005*. 14th International Union of Air Pollution Prevention and Environmental Protection Associations World Congress Brisbane 9 - 13 September 2007. [Oral]
- G5. Physick B, Cope M, Lee S, Hurley P, Dear KBG, D’Souza RM and **Hanigan IC**. *Optimum exposure fields for epidemiology and health forecasting*. 28th NATO/CCMS International Technical Meeting on Air Pollution Modelling and its Application. Leipzig, Germany. 15-19 May, 2006. [Poster]
- G4. **Hanigan IC**. *Integrating health, population and environmental data across long time-series*. The workshop on Environmental Stress and Impacts on Health. Australian National University, Canberra. November 24-25, 2005. [Oral]

- G3. **Hanigan IC.** *Applying Geographical Information Systems (GIS) to health and demographic data: A case study of Sydney.* The 2nd Innovations (Atmospheric Environment and Health Collaboration) Workshop: National and sub-national data sources in environmental health. The Australian National University, Canberra. May 5-6, 2003. [Oral]
- G2. **Hanigan IC,** Whiteway T, Balzer I, Wade A, Page D. *Identifying potential “hotspots” for pathogens in the Googong Catchment,* Australian Water Association 20th Convention, 6-10 April 2003, Perth. [Oral]
- G1. Page DW, **Hanigan IC,** van Leeuwen JA, Spark KM and Mulcahy DE. *Assessment of the treatability of dissolved organic matter (DOM) from terrestrial and freshwater sources, with alum,* Australian Water Association 20th Convention, 6-10 April 2003, Perth. [Poster]

#### Media

- H5. <http://news.anu.edu.au/?p=16631>
- H4. <http://www.abc.net.au/science/articles/2012/08/14/3567208.htm>
- H3. <http://www.livescience.com/22314-drought-may-increase-suicide-risk.html>
- H2. <http://www.welt.de/gesundheit/psychologie/article111328359/Heisses-und-extremes-Wetter-erhoeht-die-Suizidrate.html>
- H1. *Meet the Researcher* June-July 2012 edition of the National Climate Change Adaptation Research Network Human Health Newsletter.

#### Peer Reviewing

- I4. Willocks LJ, et al. (2012). Cardiovascular disease and air pollution in Scotland: no association or insufficient data and study design? BMC Public Health, 12(1), 227. doi:10.1186/1471-2458-12-227. (Nonblind review)
- I3. BMC Public Health November 2012 - (Blind review - Advised rejection).
- I2. Crisis: The Journal of Crisis Intervention and Suicide Prevention, November 2012 (Blind review - Advised rejection).
- I1. Australian and New Zealand Journal of Public Health, January 2013 (Blind review - Advised rejection).



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|----------------------------------|--|
| Programming<br>expertise         | <p>J4. I have extensive skills with the R language for statistical computing and graphics.</p> <p>J3. I contribute to several R packages and open source code project sites via my GitHub pages (<a href="https://github.com/ivanhanigan">https://github.com/ivanhanigan</a>) including (among others):</p> <p style="padding-left: 40px;"><i>opensoftware-restricteddata</i>: A Virtual Lab environment for analysing restricted data using open software.</p> <p style="padding-left: 40px;"><i>gisviz</i>: Medical Geography tools and visualisations.</p> <p style="padding-left: 40px;"><i>swishdbtools</i>: Postgres, Oracle and DDI helper functions.</p> <p style="padding-left: 40px;"><i>disentangle</i>: a toolbox for conceptual modelling; as well as multi-model and variable selection.</p> <p>J2. I also have experience with Statistical tools in Splus, Stata, Kepler-project and SPSS.</p> <p>J1. I am adept at generic programming and configuring Postgres, Post-GIS, Geoserver, QGIS, ArcGIS, Oracle-XE, Linux (Ubuntu, Centos, RHEL).</p> |
| Technical<br>courses<br>attended | <p>K10. Optimize and Tune Your PostgreSQL Database Server Performance, 13 Mar 2013. EnterpriseDB <a href="http://www.enterprisedb.com">http://www.enterprisedb.com</a>.</p> <p>K9. Computing for Data Analysis, 24 Sep - 27 Oct 2012. Prof Roger Peng Johns Hopkins Bloomberg School of Public Health, Coursera.</p> <p>K8. Bayesian Hierarchical Modelling of Spatial and Temporal Data, 21-23 November 2011, CSIRO/ANU, Canberra, ACT.</p> <p>K7. Statistical Data and Metadata eXchange (SDMX) standard and tools. 24 March 2010, Australian Bureau of Statistics.</p> <p>K6. Australian Weather and Society Integrated Studies Workshop. 29th – 2nd February 2007. Emergency Management Australia, Mount Macedon, VIC.</p> <p>K5. Spatial Analysis in Environmental and Social Epidemiology. 5th - 8th September 2005. The Australian National University, Canberra.</p> <p>K4. Formatting long documents in Microsoft Word, 2004, The Australian National University Information Literacy.</p>  |

- κ3. Endnote Referencing Software training, 2004, The Australian National University Information Literacy.
- κ2. Air Pollution Exposure: measurement, modelling and assessment. 2nd - 3rd December 2004, The Australian National University, Canberra.
- κ1. Climate Change and Health: Research Methods and Policy Issues. 29th September – 2nd October 2003, The Australian National University, Canberra.

Contribution  
to Teaching  
and Learning

- L5. I have sat on several selection panels for job interviews both at NCEPH and for other Centres at the University.
- L4. Training in software programming, data analysis and data management for staff and students.
- L3. I was one of the founding members of the ANU GIS Forum in 2009 and still organise weekly topics and speakers for the meetings.
- L2. I contribute to ANU wide data management meetings with the Australian Data Archives and the National Supercomputer facility.
- L1. I contributed Drought Severity data to several papers by members of the Collaboration on Drought, Drying and Rural Mental Health.

Grants

- M6. 2012, A Scientific Workflow System for Assessing and Projecting the Health Impacts of Extreme Weather Events. Australian National Data Service Applications project. PI Keith Dear, ANU.
- M5. 2011, Dengue Transmission under Climate Change in Northern Australia: Linking Ecological and Population Data. PI David Harley, ANU.
- M4. 2010, Suicide and Drought: Understanding Human Impacts of Environmental Change, PI Ivan Hanigan, ANU.
- M3. 2010, Climate Change and Rural Communities: Integrated study of physical and social impacts, health risks and adaptive options. PI Anthony McMichael, ANU.
- M2. 2009, I was named as Professional Staff on Understanding the Health Effects of Landscape Burning and Biomass Smoke. PI Prof David Bowman UTAS.
- M1. 2005, Health Forecasting System, PI Rennie D'Souza, ANU.

## Awards

- N6. Honorable mention by NatStats 2013 Conference Awards judging panel (Brisbane Aust. March 2013):

“An outstanding piece of complex research combining powerful methods and linked with clear communication of the results. Well researched work.”

- N5. Nov 2012 Bhati Family India Travel Grant.
- N4. Oct 2012 Runner Up, Australian National Data Service eResearch tools for the National Cloud competition.
- N3. Oct 2006 NCEPH Director’s prize for best publication for the month.
- N2. June 2003 NCEPH Director’s prize for best presentation at annual student workshop.
- N1. Jan 2003 Cooperative Research Centre Water Quality and Treatment Summer Scholar.

## Referees

- O3. Dr Bruce Doran, Senior Lecturer in Geographic Information Systems, ANU College of Medicine, Biology and Environment. Ph: 02 61253663, Email: Bruce.Doran@anu.edu.au
- O2. Professor Colin Butler, Epidemiologist, University of Canberra. Ph: 02 6201 2194, Email: colin.butler@canberra.edu.au
- O1. Dr Fay Johnston, Epidemiologist, UTAS Menzies School of Health Research. Ph: 0408266652, Email: Fay.Johnston@utas.edu.au