Rachel V Blakey **C.V.**

Postdoctoral Fellow

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Bio: I am quantitative landscape ecologist working on how anthropogenic drivers like climate change, river regulation, agriculture and fire impact biotic communities in the US, Australia and Europe. My core study animals are bats because they are widespread, diverse, high trophic level predators that are also extremely important for ecosystem services. In my most recent work, I have been investigating the importance of water resources for bats across mosaics of agricultural and natural habitats in California and South-eastern Australia. I use a combination of field surveys, acoustics, stable isotopes analysis, LiDAR point cloud processing and a range of quantitative methods to help answer my research questions in study areas across the world. My work has a strong applied focus and I have partnered with a range of conservation, forestry and water management agencies as well as private landholders during the course of my research. My approach to scientific teaching is "anyone can do science": I involve my students in real research, empower them with open source tools and guide them towards being independent researchers. I have taught a range of undergraduate biology courses from 1st to 3rd year, including lab instruction for groups of > 30 students and lecturing classes with > 200 students. In addition, I have co-ordinated a 1st year class in Environmental Science and developed course materials for Environmental Science, Advanced Field Biology, Ground and Surface Water and online Environmental Computing courses. I enjoy one-on-one mentoring of students, with a special interest in minority participation. This has led me to participate as a mentor in the *Native American and Pacific Island Research Experience* (NAPIRE) and the *Ciencia sem Fronteiras* (Science without borders) programs, mentoring students from Hawai'i, Micronesia and Brazil in tropical and invertebrate biology.

Qualifications:

2011-2017	PhD in Ecology, Dissertation title: *Drivers of bat activity and community structure within floodplains of the Murray-Darling Basin, Australia* (Centre for Ecosystem Science, University of New South Wales, Sydney, Australia).
2010	Graduate study in Spatial Information Science, Sydney University, Sydney, Australia (Course units completed: spatial analysis and modelling, remote sensing applications, multispectral and hyperspectral image processing and analysis).
2010	Certificate III in Conservation and Land Management (Natural Area Restoration), Sydney, Australia.
2003-2004	BSc (Honours I – equivalent of US research Masters) Thesis title: *Do salt and heat loads limit the rate of food intake of a migratory shorebird during the non-breeding season?* University of Queensland, Brisbane, Australia.
1999-2001	BSc (Dean's scholarship) majors: Zoology, Earth Science; minor: Botany, Monash University, Melbourne, Australia.

Employment History:

2017 (current)	**Postdoctoral Fellow** School of Natural Resources, University of Missouri / Institute for Bird Populations, MI/CA, USA.
2016	**Postdoctoral Fellow** College of Natural Resources, University of Idaho, Moscow, ID, USA.
2012-2017	**Research Associate/Casual Academic** School of Biological, Earth & Environmental Sciences (BEES), University of New South Wales, Sydney, Australia.
2012-2013	**Technical Officer** Forest Science Unit, NSW Department of Primary Industries, Sydney, Australia.
2010-2011	**Environmental Scientist** Rivers and Wetlands unit, Office of Environment and Heritage (OEH), Sydney, Australia.
2009-2011	**Ecologist** Australian Museum Business Services, Sydney, Australia.
2009-2010	**Bush Regeneration Supervisor & Consultant Ecologist** Toolijooa Environmental Restoration, Sydney, Australia.
2005-2009	**Consulting Ecologist** Biosis Research, Sydney, Australia.
2004	**Research assistant** Marine and Estuarine Ecology Unit, University of Queensland, Australia.

Scientific publications:

Blakey, R.V., Law, B.S., Straka, T.M., Kingsford, R.T. & Milne, D.J. (in review) "Importance of Wetlands to bats on a Dry Continent." *Hystrix* Special Issue: Maria João Ramos Pereira and Ludmilla Moura Souza Aguiar (Eds.) Out of Forests: Bat Diversity and Ecology in Open Areas.

Blakey, R.V. Law, B.S, Kingsford, R.T. & Stoklosa, J. (2017) Floodplain habitat mosaics: wetland importance for bats at the scale of a large river basin. *Biological Conservation. In press.*

Blakey, R.V. Law, B.S, Kingsford, R.T., & Stoklosa, J. (2017) Terrestrial laser scanning reveals below-canopy bat trait relationships with forest structure. *Remote Sensing of Environment.* 198: 40-51.

Clarke-Wood, B, Jenkins, K.M., Law, B.S. & **Blakey, R.V.** (2016) The Ecological Response of Insectivorous Bats to Coastal Lagoon Degradation. *Biological Conservation.* **202**:10-19.

Blakey, R.V., Law, B.S, Kingsford, R.T., Stoklosa, J., Tap, P. & Williamson, K. (2016) Bats respond positively to large-scale thinning of forest regrowth. *Journal of Applied Ecology*. **53**(6):1694-1703.

Blakey, R, Zharikov, Y & Skilleter, G (2006) Lack of an osmotic constraint on intake rate of the eastern curlew *Numenius madagascariensis. Journal of Avian Biology* **37**(4)**:** 299-305.

Scientific research experience:

School of Natural Resources, University of Missouri / Institute for Bird Populations (2017)

Postdoctoral Fellow, I am currently working on habitat use, with relation to fire ecology in bat communities and two raptor species (California Spotted Owls and Northern Goshawks) in Plumas National Forest, Northern California.

McLaughlin Lab, College of Natural Resources, University of Idaho (2016)

Postdoctoral Fellow, I led two studies on climate change and bat communities in the Western US. The first is a field-based study of climate refugia for bat communities across Californian foothill woodlands. I investigated the relationship between water availability and bat communities at two spatial scales. This involved modelling the relationships between bat foraging activity and prey availabilty across moisture and climate gradients. In the second study we projected range shifts for arid-adapted bats in Western US and Europe with multiple climate scenarios (University of Lisbon & Bat Conservation International). In addition I am working on several collaborative studies including a collaborative paper on effects of the recent drought on Californian foothill trees (with UC Berkeley) a review of recommendations for conserving biodiversity with relation to climate change (various contributors), and co-supervising a Masters student who is investigating climatic drivers of dieback of blue oak woodlands.

Center for Bat Research, Outreach and Conservation, Indiana State University (2015-present)

Research Associate, I led the acoustic component of the project: *Distribution of bats across the Great Smoky Mountains National Park with a focus on two declining Myotis (M. septentrionalis and M. sodalis)*. The project is in progress: we have completed internal reporting and are currently writing up the results for publication in a peer-reveiwed journal. This study is a partnership between Indiana State University and the Great Smoky Mountains National Park.

Office of Environment and Heritage – Rivers and Wetlands Unit (2010-2011)

Environmental Scientist, I conducted spatial data analysis, modelling and provided scientific input to statewide and catchment level conservation planning projects within New South Wales in Australia. I also assisted in waterbird, frog, tadpole and fish field surveys in Lowbidgee wetlands, southeastern Australia, as part of long-term environmental flow response research. I gave advice and undertook consultation for developing a field methodology for a frog community-level monitoring program to support wetland condition assessments.

University of Queensland (2003-2004)

Research Assistant, I undertook aquatic field surveys and estuarine fish, crustacean and macro-invertebrate identification to species level, as part of a habitat mosaics study in Moreton Bay (Ramsar wetland), Queensland, Australia.

Academic teaching and mentoring experience:

Organization for Tropical Studies (2015)

Native American and Pacific Islander Research Experience (NAPIRE) Research Mentor (Influence of water presence on bat communities and their diet - Natasha Edwin; Analyzing the Relationship Between Stream Structure and Bat Phonic Richness and Activity in a Neotropical Forest Fragment – Aloha Kapono). I mentored two students in developing their own tropical ecology research projects over 6 weeks: from developing testable hypotheses to presenting their final work orally and in writing. I also conducted an introductory GIS workshop (using open source *QGIS*) and an introductory workshop in basic statistics and *R/Rstudio* use for students in the program.

University of New South Wales - School of Biological, Earth & Environmental Sciences (2011-2014)

Honours co-supervisor (The ecological response of insectivorous bats to coastal lagoon degradation – Bradley Clarke-Wood) (2014-present), with Brad Law & Kim Jenkins (joint supervisors). As a co-supervisor to Bradley, I was responsible for day-to-day supervison including mentoring in field and laboratory techniques, training in statistical analysis, map and graph production (*ArcGIS* and *R/Rstudio*) as well as scientific writing and encouraging leadership and critical thinking. I also mentored Bradley through his first experience with the scientific peer review process and his study has been published in *Biological Conservation*.

Environmental computing project contributor (2015), I prepared 7 tutorials in *Rmarkdown* on data wrangling, working with climate variables, model-based multivariate statistics and time series forecasting, available at environmentalcomputing.net. These tutorials are aimed at building quantitative skills, including statistical literacy and coding (*R*) skills in students and faculty in the field of ecology. The tutorials address both common and emerging methods within ecology and related fields.

***Ciencia sem Fronteiras* (Science without borders) supervisor (Daniela Tenorio & Caio de Souza Ferreira) (2013-2014),** I supervised two students in laboratory-based research projects for one semester, including mentoring in laboratory techniques (insect identification), instruction in GIS software (*ArcGIS*) and spatial analysis techniques.

Lecturer (*Advanced Field Biology*) (2012-2014), I developed and delivered a component of 3rd year *Advanced Field Biology* course: "Bats in terrestrial and aquatic food webs" (approximately 20% of the course content). Additionally, I designed and delivered two 3-hour statistics workshops using *R* and *Rstudio* to construct mixed-effects models and to undertake multivariate analyses and assited in development of course materials an d delivery of two 3-hour statistical workshops utilising *Primer* and *SPSS* to conduct analyses of variance and multivariate ordinations. Finally, I mentored a 6-month group project (4 students) in spatial organisation of roosting and behaviour of the Grey-headed flying fox (*Pteropus poliocephalus*).

Assistant co-ordinator (*Ecology, Sustainability & Environmental Science*) (2013), I co-ordinated and guest lectured for 1st year Ecology, Sustainability & Environmental Science (> 200 students).

Casual Academic (other courses) (2011-2014), I prepared course materials, ran practical laboratory classes, computer-based and field activities and guest lectured for other UNSW courses including: 1st year Evolutionary & Functional Biology, 2nd year Ground and Surface water, 2nd year Invertebrate Biology and 3rd year Marine and Freshwater Ecology.

Selected reports:

Blakey, R, Currie, V and Muir, G (2011) Marrickville Biodiversity Strategy and Action Plan. Marrickville Council, Lewisham, NSW. (Prepared by AMBS and Marrickville Council for Marrickville Council) (https://www.marrickville.nsw.gov.au/en/environment/in-your-community/biodiversity/).

Turak, E, Melrose, R, Islam, T, Imgraben, S and **Blakey, R** (2011) Testing the Framework for the Assessment of River and Wetland Health (FARWH) in New South Wales wetlands, Milestone 5 Final Report. Office of Environment and Heritage, Sydney, NSW. (Prepared by OEH for the National Water Commission) (http://www.environment.nsw.gov.au/resources/water/110779farwhtest.pdf).

Claus, S, Imgraben, S, Brennan, K, Carthey, A, Daly, B, **Blakey, R**, Turak, E and Saintilain, N (2011) NSW Monitoring, Evaluation and Reporting Program technical report series: Wetlands. Office of Environment and Heritage, Sydney, NSW (http://www.environment.nsw.gov.au/resources/soc/20110716WetlandsMainTRS.pdf).

Conference proceedings (presenting author):

Blakey, R.V. Law, B.S., Straka, T, Kingsford, R.T., Milne, D (2016) Importance of wetlands to bats on a dry continent. 17th International Bat Research Conference, Durban, South Africa.

Clarke-Wood, B, Jenkins, K., Law, B.S. & **Blakey, R.V.** (2016) The ecological response of insectivorous bats to coastal lagoon degradation. 17th International Bat Research Conference, Durban, South Africa.

Blakey, R.V. Law, B.S, Kingsford, R.T., Tap, P., Williamson, K. & Stoklosa, J. (2014) Investigating bat response to forest thinning at the community level. Proceedings of the North American Society for Bat Research 44th Annual Symposium on Bat Research, Albany, NY, US.

Blakey, R.V., Jenkins, K., Law, B.S., Kingsford, R. Mazumder, D. (2014) Nocturnal food webs: partitioning of prey resources between terrestrial and aquatic ecosystems by floodplain bats. Proceedings of 16th Australasian Bat Society Conference, Townsville, 2014, (1st Prize, PhD/Masters student poster).

Blakey, R.V., Law, B.S., Kingsford, R. Tap, P., Williamson, K., Stoklosa, J. (2014) A bat's ear view of the forest: the contrasting responses of bats and their insect prey to gap density. Proceedings of 16th Australasian Bat Society Conference, Townsville, 2014.

Blakey, R.V., Jenkins, K., Kingsford, R., Law, B.S. (2013) Nocturnal food webs: partitioning of prey resources between terrestrial and aquatic ecosystems by a high level predator of floodplain habitats. Proceedings of Australian Society for Limnology Congress, 2013, Canberra (1st Prize, PhD/Masters student presentation).

Blakey, R.V., Law, B.S., Jenkins, K., Kingsford, R., Stoklosa, J. (2013) Bats across biomes: bat response to flooding frequency across a large semi-arid floodplain system. 16th International Bat Research Conference, San José, Costa Rica.

Blakey, R.V., Law, B.S., Kingsford, R (2013) Floodplain bats: bat response to flooded habitats of the Murray-Darling. Proceedings of Australian Mammal Society Conference, 2013, Sydney.

Blakey, R.V., Law, B.S., Kingsford, R (2012) Bats across biomes: comparing the value of wetland and dryland habitats within the Murray-Darling. Proceedings of Ecological Society of Australia Conference, 2012, Melbourne.

Blakey, R.V., Law, B.S., Kingsford, R (2012) Bats in the floodplain: how important are the riverine and wetland habitats of the Murray-Darling to its bat communities? Proceedings of 15th Australasian Bat Society Conference, 2012, Melbourne.

Awards and PI Grants:

2014	First prize PhD/Masters student poster presentation, 16th Australasian Bat Society Conference
2013	First prize PhD/Masters student presentation, Australian Society for Limnology Congress ($1,000)
2013	Mazda Foundation Grant ($10,000)
2013	Ecological Society of Australia Student Research Award ($1,000)
2012	Australasian Bat Conservation Fund Grant, Australasian Bat Society ($500)
2012	Wildlife Preservation Society of Australia, Wildlife Conservation Grant ($1,000)
2012	Postgraduate Research Forum Species Conservation Prize, UNSW
2011	Australian Postgraduate Award for PhD studies, full scholarship
1999	Monash University Deans Scholar program and full scholarship

Technical skills & certification:

Field skills: 4WD Off Road Training and experience, 2004, 2009; DECA defensive driving training, 2009; HSTRA100 Basic Height Safety and Tree Access, 2004.

Naturalist skills: Advanced Plant Identification Skills for research and environmental assessment, 2013; Eucalypt identification course, 2012; Grasses of Greater Sydney Identification Workshop, June, 2009; Bats of Gluepot Reserve Course (bat capture, handling, identification and euthanasia techniques) March, 2007; State Forest Wildlife Course (Frog, Bat and Reptile Species Identification and Survey Skills) Dorrigo September, 2007; Australian tadpole field and laboratory identification course with Marion Anstis, 2007.

Quantitative skills: Advanced *R* skills including a variety of modelling techniques, spatio-temporal analysis, plotting and function writing. Contributor to Environmental Computing project (environmentalcomputing.net) 2016: free online tutorials in biostatistics using *R*; Intermediate graduate-level statistics course (UNSW) 2012; Spatio-Temporal Statistical Modelling short course, National Institute for Applied Satistics Research Australia 2015; Workshop in Occupancy modelling in R, Darryl MacKenzie 2015; Postgraduate training and proficient in GIS and image-processing software: *QGIS*, *ArcGIS*, *ENVI.*

Writing and teaching: Writing Clear Science workshop Marina Hurley, 2012; University of New South Wales, Faculty of Science Tutor/Demonstrator Training program (UNSW), 2012.

Industry Experience:

NSW Department of Primary Industries – Forest & Rangeland Ecosystems (2012-2013)

Technical Officer, I conducted fauna surveys for bats and non-flying mammals, including Elliot trapping, harp-trapping, radio-tracking, acoustic recording, acoustic analysis and camera trapping, in various locations in New South Wales, Australia.

Australian Museum Business Services (2009-2011)

Project Manager, I developed a Biodiversity Strategy and Action Plan for Marrickville Council (New South Wales, Australia), working in collaboration with council biodiversity, environmental and recreational managers, as well as local environment committees. Activities included field assessments, interviews, community outreach and consultation and initiation of two citizen science programs.

Ecologist, I conducted a range of targeted surveys for threatened species within Sydney and Western Australia.

Toolijooa Environmental Restoration (2009-2010)

Bush Regeneration Supervisor, I taught and supervised Aboriginal students in bush regeneration skills, working towards formal certification in natural resource management and achieving practical restoration outcomes on Native Title land in association with Gandangara Land Council.

Bush Regenerator & Consultant, I utilised a range of restoration techniques to restore native vegetation in the Greater Sydney area. I also provided advice to Toolijooa management about environmental consulting, assistance on proposal-preparation and field methodologies.

Biosis Research (2005-2009)

Ecologist, I planned and conducted a range of impact assessments, monitoring programs and targeted surveys for flora and fauna in New South Wales, Victoria and Tasmania within terrestrial, estuarine and freshwater systems. The majority of my work involved bird surveys and frog surveys.

Selected Volunteer Work

Field Assistant, Monitoring White-striped Freetail Bat (*Austronomus australis*) population at Sydney Olympic Park (*2011 for Marg Turton & Sydney Olympic Park Authority*).

Expedition team Member, Conducting seabird survey of Broughton Island to establish baseline dataset of seabirds utilising the island as part of a state-wide survey of seabird breeding islands (*2009 for Australasian Seabird Group in association with OEH)*.

Assisting with monitoring of re-located breeding population of Gould's Petrels on Boondelbah Island (*2009 for Australasian Seabird Group in association with OEH*).

Field Assistant, Trapping and obtaining reference calls from bat species in order to refine the NSW *Anascheme* Anabat analysis key program *(2009 for Forests NSW).*

Assisting PhD candidate with trapping, stag-watching and radio-tracking bat surveys in Cumberland State Forest (2009 for UNSW).

Museum Intern, Targeted fauna surveys for bats, rodents and primates in remnant rainforest fragments in Kenya, cataloguing of West African bat collection including identification and taxonomic organisation for the head of Mammalogy at the National Museum of Kenya (*2009 for National Museums of Kenya, Nairobi*).

Expedition team member, Ngulia migratory passerine ringing expedition, including mist netting and visual counts of some species at Ngulia Lodge, Tsavo West National Park, Kenya (*2008 for Nairobi Ringing Group*).

Divemaster, organised and supervised snorkelling classes for the staff and families of an environmental charity organisation in Watamu, Kenya (*2008 for A Rocha Kenya*).

Field assistant, nest inspection and observational surveys of the Striped Cheeked and Cabanis's Greenbuls in fragmented rainforest of Taita Hills, Kenya (*2008 for PhD study, Ghent University*).

Expedition team member, Shorebird and Tern surveys including Canon-netting, mist netting and visual counts during the AWSG annual North-west Expedition at Roebuck Bay and Eighty Mile Beach Ramsar wetlands, Western Australia (*2007 for Australasian Wader Study Group*).

Selected Outreach and Policy:

Invited speaker at Sedgwick Reserve, University of California, Santa Barbara *Sedgwick Reserve: Wonderful Bats* (March, 2017).

Invited panellist at Scripps College Forum, *Authentic Leadership: Following your passion.* For Scripps College Laspa Center for Leadership, Claremont, CA (February, 2017).

Article on "The status of research on bat response to climate change" for IUCN Bat Specialist Group Newsletter (2017) (http://www.iucnbsg.org/newsletter.html).

Blog on forest thinning and bats for The Applied Ecologist's Blog (Journal of Applied Ecology) (November 2016) (https://jappliedecologyblog.wordpress.com/2016/11/18/forest-thinning-a-bats-friend-or-foe/).

Foothill Advocate article (Sierra Foothills Conservancy) on bats of Stockton Preserve, CA, US (November, 2016) (http://sierrafoothill.org/wp-content/uploads/2016/07/66985-SierraFoothill_Newsletter_LR.pdf).

Radio interview involving four of my undergraduate and Honours bat students (June 3rd, 2014) (http://eastsidefm.org/lifestyle/boilingpoint/).

Preparation of a submission and appearance at a hearing for *Parliamentary Inquiry into Management of Public Lands in New South Wales*. (https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-submission-details.aspx?pk=%2052900).

Information sheet for Macquarie Marshes Environmental Landholders Association (April, 2013) (http://www.macquariemarshes.com/community#.VCmQW1d0Zrs).

Australian Geographic Outdoor Magazine (Jan-Feb, 2013) on bats of the Murray-Darling, part of *Murray Magic* article.

Australian Wildlife magazine article on bats of the Murray-Darling (Spring #4, 2012).

Research Referees:

Dr Blair McLaughlin (Postdoc advisor)
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Professor Richard Kingsford (PhD advisor)
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Dr Brad Law (PhD advisor)
Principal Research Scientist
Forest Science Unit
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Dr Joy O'Keefe (Collaborator)
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Dr Kim Jenkins (Collaborator)
Research Fellow
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Teaching/Mentoring Referees:

Dr Barbara Dugelby (work supervisor – NAPIRE program)

NAPIRE Program Coordinator

Organization for Tropical Studies

barbara@dugelby.com

830-965-6869 (US)

Dr Kim Jenkins (work supervisor - UNSW)

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