

Dr Nicholas J Clark

ARC DECRA Fellow- University of Queensland, School of Veterinary Science
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Career Summary

An ecologist by training – I hold a B.Sc. (Hons) in Marine Ecology from the University of North Carolina, Wilmington and a Ph.D. in Ecological Modelling from Griffith University. I am broadly interested in exploring new ways to (1) understand how host-parasite interactions are formed and (2) predict how they will change over time. As a DECRA fellow at University of Queensland, my current research focuses on developing computational tools and adapting techniques from statistical forecasting to study how organisms and ecosystems respond to environmental change. This work can be applied to investigate natural dynamics for a range of host-parasite systems.

Transferable Skills

- Strong communication skills: >40 publications in peer-reviewed journals; >12 international presentations
- Extensive experience in ecological programming: maintain four R packages for molecular genetics and ecology research
- Aptitude for leadership: trained seven postgraduate students in bioinformatics, laboratory and statistical techniques
- Proven ability to obtain funding: >\$700,000 external funding from domestic and international organisations
- Industry networking experience: helped secure data-sharing partnerships and develop joint proposals with three industry partners and one Australian government partner

Qualifications

PhD

Griffith University (Supervisors: Dr Sonya Clegg, Dr Robert Adlard, Prof. Hamish McCallum)

Thesis: *The distribution and diversity of avian malaria parasites in Australian and Southern Melanesian birds*

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James Cook University (Supervisors: Prof Garry Russ, Dr Lynne van Herwerden) Thesis: *Connectivity of butterflyfishes: pairing molecular methods and field observations*

BSc (honours)

University of North Carolina at Wilmington; North Carolina, USA

Professional Experience

ARC DECRA Fellow (02/2021 - present)

University of Queensland, School of Veterinary Science

- Supervising three RhD students in multivariate modelling and veterinary epidemiology
- Leading innovative research on the use of multivariate time series models for forecasting ecological responses to change

Lecturer (08/2019 - 02/2021)

University of Queensland, School of Veterinary Science (Adviser: Prof Nigel Perkins)

- Supervising three RhD and two undergraduate students in disease ecology and quantitative genetics
- Coordinating a second-year animal genetics course for BVetSci students
- Leading a UQ Early Career Research Grant funded project on the use of machine learning genetic algorithms to forecast parvovirus tick infestation risk

Postdoctoral Fellow / Lecturer (7/2016 - 07/2019)

University of Queensland, School of Veterinary Science (Adviser: A/Prof Ricardo Soares Magalhães)

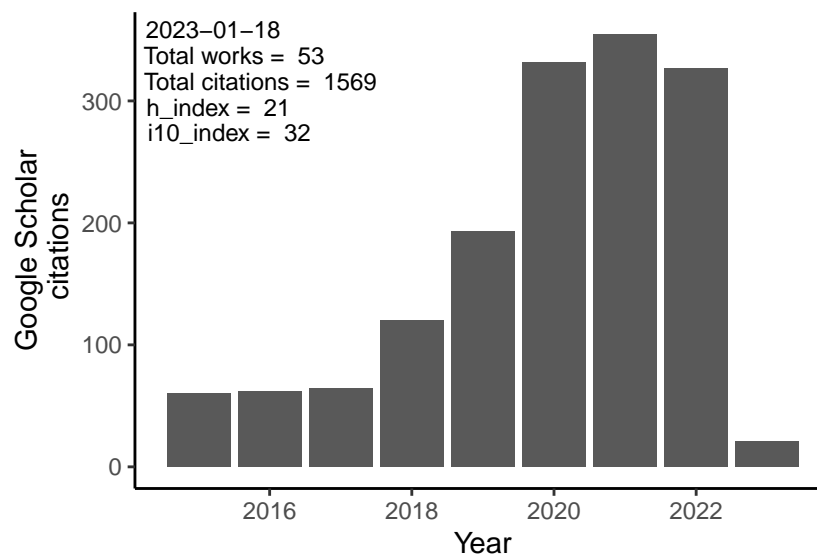
- Led a National Geographic funded project on the spread of parasites at the human-wildlife interface
- Coordinated three UQ undergraduate genetics courses
- Developed novel network tools to study biotic interactions and their influences on infection risk

Research Assistant (1/2016 - 7/16)

University of Queensland, School of Veterinary Science (Adviser: Dr Steven Kopp)

- Conducted molecular research into population genetics of soil-transmitted helminth parasites
- Established protocols to develop next generation sequencing tools for cat fleas

Citations



Select Publications

- Clark, NJ**, Wells, K. 2022. Dynamic Generalised Additive Models (DGAMs) for forecasting discrete ecological time series. *Methods in Ecology and Evolution* DOI: <https://doi.org/10.1111/2041-210X.13974> (IF: 8.330)
- Powell-Romero, F, Fountain-Jones, F, Norberg, A, **Clark, NJ**. 2022. Improving the predictability and interpretability of co-occurrence modelling through feature-based joint species distribution ensembles. *Methods in Ecology and Evolution* DOI: <https://doi.org/10.1111/2041-210X.13915> (IF: 8.330)
- Fecchio, A, et al. Global drivers of avian haemosporidian infections vary across zoogeographical regions. 2021. *Global Ecology and Biogeography* DOI: <https://doi.org/10.1111/geb.13390> (IF: 6.045)
- Fountain-Jones, NM, Kozakiewicz, CP, Forester, BR, Landguth, EL, Carver, SC, Charleston, M, Gagne, RB, Greenwell, B, Kraberger, S, Trumbo, DR, Mayer, M, **Clark, NJ**, Machado, G. 2021. MrIML: Multi-response interpretable machine learning to model genomic landscapes. *Molecular Ecology Resources* DOI: <https://doi.org/10.1111/1755-0998.13495> (IF: 6.185)
- Clark, NJ**, Kerry, JT, and Fraser, CI. 2020. Rapid winter warming will disproportionately disrupt marine fish community structure *Nature Climate Change* DOI: <https://doi.org/10.1038/s41558-020-0838-5> (IF: 20.893)
- Clark, NJ**, Owada, K, Ruberanziza, E, Ortu, G, Umulisa, I, Bayisenge, U, Mbonigaba, JB, Mucaca, JB, Lancaster, W, Fenwick, A, Soares Magalhães, RJ, and Mbituyumuremyi, A. 2021. Parasite associations predict infection risk: incorporating co-infections in predictive models for neglected tropical diseases. *Parasites & Vectors* DOI: 10.1186/s13071-020-04016-2. (IF: 3.035)
- Peel, AJ, Wells, K, Giles, J, Boyd, V, Burroughs, A, Edson, D, Crameri, G, Baker, ML, Field, H, Wang, LF, McCallum, H, Plowright, RK and **Clark, NJ**. 2019. Synchronous shedding of multiple bat paramyxoviruses coincides with peak periods of Hendra virus spillover. *Emerging Microbes & Infections* 8:1314-1323. (IF: 6.212)
- Wells, K, and **Clark, NJ**. Host specificity in variable environments. 2019. *Trends in Parasitology* DOI: 10.1016/j.pt.2019.04.001 (IF: 7.929) [UQ media release](#)
- Fecchio, A, Wells, K, Bell, JA, Tkach, VV, Lutz, HL, Weckstein, JD, Clegg, SM, and **Clark, NJ**. 2019. Climate variation influences host specificity in avian malaria parasites. *Ecology Letters* 22 547-557 (IF: 9.137)
- Clark, NJ**, Wells, K, and Lindberg, O. 2018. Unravelling changing interspecific interactions across environmental gradients using Markov random fields. *Ecology* DOI: 10.1002/ecy.2221 (IF: 4.809) [UQ media release](#)
- Wells, L, Gibson, DI, **Clark, NJ**, Ribas, A, Morand, S, McCallum, H. 2018. Global spread of helminth parasites at the human – domestic animal – wildlife interface. *Global Change Biology* DOI: 10.1111/gcb.14064 (IF: 8.502)
- Clark, NJ** and Clegg, SM. 2017. Integrating phylogenetic and ecological distances reveals new insights into parasite host specificity. *Molecular Ecology* 26(11), 3074-3086 (IF: 6.086)
- Clark, NJ**, Wells, K, Dimitrov, D and Clegg, SM. 2016. Co-infections and environmental conditions drive the distributions of blood parasites in wild birds. *Journal of Animal Ecology* 85(6), 1461-1470 (IF: 4.474)
- Goulding, W, Adlard, RD, Clegg, SM and **Clark, NJ**. 2016. Molecular and morphological description of *Haemoproteus* (*Parahaemoproteus*) *bukaka* (species nova), a haemosporidian associated with the strictly Australo-Papuan host Subfamily Cracticinae. *Parasitology Research* 115, 3387-3400 (IF: 2.329)
- Clark, NJ**, Clegg, SM and Lima, MR. 2014. A review of global diversity in avian haemosporidians (Plasmodium and Haemoproteus: Haemosporida): new insights from molecular data. *International Journal for Parasitology* 44(5), 329-338 (IF: 3.730)

Service and Discipline Involvement

Service

- Contributing member of UQ School of Veterinary Science Research Committee
- Served as panel member to mark three UQ RhD theses
- Participated in teaching and assignment design for four undergraduate courses at UQ
- Currently supervising three RhD students and one Honours student
- Student volunteer for the 2017 Australian Society for Parasitology International Conference

Select Funding Support

\$AU10,000: Feline Health Research Foundation. 2022. Epidemiology of feline upper respiratory tract infections in shelter cats in Australia

\$AU445,009: Australian Research Council Discovery Early Career Award. 2020. Towards reliable and explainable models for anticipating ecological change

\$AU10,178: John and Mary Kibble Trust. 2019. Deep sequencing of β -tubulin genes to screen for possible drug resistance mechanisms in canine hookworms infecting Australian dogs

\$AU35,090: UQ Early Career Researcher Grant. 2019. *TickAlert*: development of an integrated early warning surveillance platform for tick paralysis

\$US150,000: World Health Organization. 2018. Mapping the emergence, spread and transmission pathways of ESBL-producing *E. coli*.

\$US18,400: National Geographic Scientific Research Grant. 2017. Tracing the spillover of fleas and paralysis ticks between wildlife and domestic pets in Australia

\$AU4,975: Birds Queensland Research Award. 2015. The role of invasive birds as carriers of exotic pathogens; implications for co-occurring native birds

Mentoring And Research Training

2021 - present

Supervising three UQ PhD students (U. Kennedy, N. Karunaratna and F. Powel), studying veterinary epidemiology of cat flu and multivariate models for predicting pathogen co-infections

2019 - 2020

Supervising UQ Masters student (S. Gericke), developing a molecular toolkit to study the population genomics of cat fleas

2018 - present

Supervising UQ Honours student (T. Nguyen), studying population genetics and spatial epidemiology of zoonotic helminths in domestic dogs

2017 - present

Co-supervising UQ PhD student (A. McGowan), studying seascape genomics of dugongs

2016 - present

Co-supervising UQ PhD student (T. Proboste), studying population genomics and host-parasite interactions in paralysis ticks