



## Tyler Bonnell, Ph.D.

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### Research Profile

Fields: Behavioural Ecology, Movement Ecology, Data Science, Machine Learning, Statistics, Complex Adaptive Systems, Computational Geography.  
Interests: Animal social networks, social-ecological systems, propagation of infectious disease, human-environment interactions, spatial-temporal models, decision support tools.  
Languages: Fluent in English with working knowledge of French  
Citizenship: Canadian

### Professional and Academic Appointments

2023-Present Assistant Professor – Computer Science – University of Calgary  
2021-Present Chief Scientific Officer – AIMH Inc  
2021-2023 Coordinator of Data Science and Instructor – University of Lethbridge  
2018-2023 Research Fellow – Université du Québec en Outaouais  
2020-2021 Research Associate – University of Lethbridge  
2014-2020 Post-Doctoral Fellow – University of Lethbridge

### Education

2010-2014 Ph.D. in Geography, McGill University.  
Thesis title: “*Spatial simulations of infectious disease: environment, behaviour, and their interaction in a primate population.*” Co-Advised by: Raja Sengupta (Geography), and Colin Chapman (Anthropology/School of Environment).

2008-2010 M.Sc. in Geography, McGill University.  
Thesis title: “*Agent-based modeling for use in wildlife diseases: a case study on how environmental variables can affect host-parasite interactions in the red colobus monkey.*” Co-Advised by: Raja Sengupta (Geography), and Colin Chapman (Anthropology/School of Environment)

2004-2008 B.Sc. in Agriculture and Environmental sciences, McGill University.  
Major: Environmetrics, Minor: Geographic information systems. Supervised by: Pierre Dutilleul (Plant Science)

## Peer-reviewed Publications

- [51] Vilette, C., **T.R. Bonnell**, M.J. Dostie, S.P. Henzi, L. Barrett (2023). Strong ties formation, composition and processes at play during the developmental period of juvenile vervet monkeys. *Animal Behaviour*, 201, 137-156.
- [50] Henzi, S.P., R.A. Blerch, **T.R. Bonnell**, M. Clarke, M.J. Dostie, M. Lucas, J. Jarrett, R. McFarland, C. Nord, A. Takahashi, C. Vilette, C. Young, M.M. Young, L. Barrett (2023). Estimates of life history parameters in a high latitude, arid-country vervet monkey population. *American Journal of Primatology*, e23527.
- [49] Blerch, R.A., **T.R. Bonnell**, M. Clarke, M.J. Dostie, M. Lucas, J. Jarrett, R. McFarland, C. Nord, A. Takahashi, S. Varsanyi, C. Vilette, C. Young, L. Barrett, S.P. Henzi (2023). Maternal social position and survival to weaning in arid-country vervet monkeys. *American Journal of Biological Anthropology*, 181(1), 3-9.
- [48] **Bonnell, T.R.**, J.R. Ochieng, C.A. Chapman (2023). Conditions facilitating a “landscape of fear from disease” in African forest mammals. *Movement Ecology of Afrotropical Forest Mammals*, 133-150.
- [47] Vazquez-Cardona, J., **T.R. Bonnell**, P.C. Mower, O.J. Medina, H. Jiskoot, D.M. Logue (2023). Vocal performance increases rapidly during the dawn chorus in Adelaide’s warbler (Setophaga adelaidae). *Behavioral Ecology*, arad030.
- [46] Stulp G., **T.R. Bonnell**, L. Barrett (2023). Simulating the evolution of height in the Netherlands in recent history. *The History of the Family*, 28(2), 434-456.
- [45] **Bonnell, T.R.**, C. Vilette, S.P. Henzi, & L. Barrett (2023). Network reaction norms: taking account of network position and plasticity in response to environmental change. *Behavioral Ecology and Sociobiology*, 77(3), 35.
- [44] Vilette, C., T.R. **Bonnell**, M.J. Dostie, S.P. Henzi, & L. Barrett (2022). Network formation during social integration in juvenile vervet monkeys. *Animal Behaviour*, 194, 205-223.
- [43] Nord, C, **T.R. Bonnell**, D. Roth, M. Clarke, M. Dostie, S.P. Henzi, L. Barrett. (2022). Fear of missing out? Personality and plasticity in food neophilia by wild vervet monkeys, *Chlorocebus pygerythrus*. *Animal Behaviour*, 0003-3472.
- [42] **Bonnell, T.R.**, S. Peter Henzi and Louise Barrett. (2022). Using network synchrony to identify drivers of social dynamics. *Proceedings of the royal society B*. 289: 20220537.



- [41] **Bonnell, T.R.**, Robert Michaud, Angélique Dupuch, Véronique Lesage, Clément Chion. (2022). Extracting spatial networks from capture–recapture data reveals individual site fidelity patterns within a marine mammal’s spatial range. *Ecology and Evolution*. 12(2): e8616.
- [39] Lagrois, D., **T.R. Bonnell**, Ankita Shukla, Clément Chion. (2022). Gradient boosting method to tackle high computing demand in underwater acoustic propagation modeling. *Journal of Marine Science and Engineering*. 10(7), 899.
- [38] McFarland R., S.P. Henzi, L. Barrett, **T.R. Bonnell**, A. Fuller, C. Young, R.S. Hetem (2021) “Fevers and the social costs of acute infection in wild vervet monkeys” *Proceedings of the National Academy of Sciences*. 118(44), e2107881118.
- [37] Blersch, R., **Bonnell, T. R.**, Ganswindt, A., Young, C., Barrett, L., & Henzi, S. P. (2021). Sick and tired: sickness behaviour, polyparasitism and food stress in a gregarious mammal. *Behavioral Ecology and Sociobiology*, 75(12), 1-15.
- [36] Henzi S.P., **T.R. Bonnell**, G. M. Pasternak, N. J. Freeman, M. J. Dostie, S. Kienzle, C. Vilette, L Barrett (2021) “Keep calm and carry on: reactive indifference to predator encounters” *Animal Behaviour*, 181, 1-11.
- [35] Chion C., **T.R. Bonnell**, D. Lagrois, R. Michaud, V. Lesage, A. Dupuch, I.H. McQuinn, S. Turgeon (2021) “Agent-based modelling reveals a disproportionate exposure of females and calves to a local increase in shipping and associated noise in an endangered beluga population” *Marine Pollution Bulletin*, 173, 112977.
- [34] Blersch R., **T.R. Bonnell**, L Barrett, SP Henzi (2021) “Seasonal effects in gastrointestinal parasite prevalence, richness and intensity in vervet monkeys living in a semi-arid environment” *Journal of Zoology*, 314(3), 163-173.
- [33] Adams, F., T.J. Arseneau-Robar, **T.R. Bonnell**, S. Stead, J. Teichroeb. (2021) “Temporal patterns in the social network of core units in Rwenzori Angolan colobus monkeys: effects of food availability and inter-unit dispersal” *Ecology and Evolution* 11: 3251– 3263.
- [32] Piefke, T., **T.R. Bonnell**, G. DeOliveira, H. Janeski, S.E. Border, T. Brown, P.D. Dijkstra. (2021) “Social network stability is impacted by removing a dominant male in replicate dominance hierarchies of a cichlid fish” *Journal of Animal Behaviour*, 175 (2021): 7-20.
- [31] Nord, C., **T.R. Bonnell**, S.P. Henzi, L. Barrett (2021) “Tolerance of muzzle contact underpins the acquisition of foraging information in vervet monkeys (*Chlorocebus pygerythrus*)” *In press at the Journal of Comparative Psychology*.
- [30] Green S.J., B.J. Boruff, **T.R. Bonnell**, C.C. Grueter (2020) “Chimpanzees Use Least-Cost Routes to Out-of-Sight Goals” *Current Biology* 30, 4528-4533.e5.



- [29] **Bonnell, T.R.**, C. Vilette, Young, C., S.P. Henzi, L. Barrett (2020) “Formidable females redux: male social integration into female networks and the value of dynamic multilayer networks” *Current Zoology*, zoaa041.
- [28] Vilette C., **T.R. Bonnell**, S.P. Henzi, L. Barrett (2020) “Comparing dominance hierarchy methods using a data-splitting approach with real-world data.” *Behavioural Ecology*, araa095.
- [27] **Bonnell, T.R.**, C. Vilette (2020) “Constructing and analyzing time-aggregated networks: the role of bootstrapping, permutation, and simulation.” *Methods in Ecology and Evolution*, 00, 1–13.
- [26] Jarrett, J. D., **T.R. Bonnell**, M. J. Jorgensen, C. A. Schmitt, C. Young, M. Dostie, L. Barrett, and S. P. Henzi (2020) "Modeling variation in the growth of wild and captive juvenile vervet monkeys in relation to diet and resource availability." *American journal of physical anthropology*, 171, 89– 99.
- [25] Young C., **T.R. Bonnell**, L.R. Brown, M.J. Dostie, A. Ganswindt, S. Kienzle, R. McFarland, S.P. Henzi, and L. Barrett (2019) “Climate induced stress and mortality in vervet monkeys.” *Royal Society Open Science*, 6, 191078.
- [24] **Bonnell, T.R.**, S.P. Henzi., L. Barrett. (2019). “Functional social structure in baboons: Modelling interactions between social and environmental structure in group-level foraging.” *Journal of Human Evolution*, 126, 14-23.
- [23] Kessler, S., **T.R. Bonnell**, J. Setchell, and C.A. Chapman. (2018). “Social Structure Facilitated the Evolution of Care-giving as a Strategy for Disease Control in the Human Lineage.” *Scientific Reports*, 8, 13997.
- [22] **Bonnell, T.R.**, R.R. Ghai, T.L. Goldberg, Raja Sengupta, and C.A. Chapman (2018) "Spatial configuration becomes more important with increasing habitat loss: a simulation study of environmentally-transmitted parasites" *Landscape Ecology*, 33 (8), 1259-1272.
- [21] Chapman, C.A., K. Valenta, **T.R. Bonnell**, K. Brown, L.J. Chapman (2018) “Solar radiation drives fruit phenology: Evaluating a 16 year record from Kibale National Park, Uganda” *Biotropica*. 50 (3), 384-395.
- [20] Jarrett, J.D., **T.R. Bonnell**, C.J. Young, L. Barrett and S.P. Henzi (2018) "Network integration and limits to social inheritance in vervet monkeys" *Proceedings of the Royal Society B*. 285 (1876), 20172668.



- [19] Reyna-Hurtado, R., J.A. Teichroeb, **T.R. Bonnell**, R.U. Hernández-Sarabia, S.M. Vickers, J.C. Serio-Silva, P. Sicotte, and C.A. Chapman (2017) "Primates adjust movement strategies due to changing food availability" *Behavioral Ecology*. 29 (2), 368–376.
- [18] **Bonnell, T.R.**, Clarke, P.M., Henzi, S.P. & Barrett, L. (2017) Individual-level movement bias leads to the formation of higher-order social structure in a mobile group of baboons. *Royal Society Open Science*. 4 (7), 170148.
- [17] Kessler, S.E., **T.R. Bonnell**, R.W. Byrne, C.A. Chapman (2017) "Selection to outsmart the germs: The evolution of disease recognition and social cognition." *Journal of Human Evolution*. 108, 92-109.
- [16] **Bonnell, T.R.**, S.P. Henzi, L. Barrett (2016) "Direction matching for sparse movement datasets: determining interaction rules in social groups." *Behavioural Ecology*. 28 (1), 193-203.
- [15] **Bonnell, T.R.**, R.R. Ghai, T.L. Goldberg, R. Sengupta, and C.A. Chapman (2016) "Spatial patterns of persistence for environmentally transmitted parasites: Effects of regional climate and local landscape" *Ecological modelling*. 338, 78-89.
- [14] Dostie, M., D. Lusseau, **T.R. Bonnell**, P. Clarke, G. Chaplin, S. Kienzle, L. Barrett, S.P. Henzi, (2016) "Proof of principle: the adaptive geometry of social foragers." *Animal Behaviour*. 119, 173-178.
- [13] **Bonnell, T.R.**, C.A. Chapman, and R. Sengupta (2016) "Interaction between scale and scheduling choices in simulations of spatial agents" *International journal of Geographic Information Science*. 30 (10), 2075-2088.
- [12] Schoof, V. A. M., **T.R. Bonnell**, K.M. Jack, T.E. Ziegler, A.D. Melin, L.M. Fedigan (2016) "Male endocrine response to seasonal varying environmental and social factors in a Neotropical primate, *Cebus capucinus*." *American Journal of Physical Anthropology*. 159 (4), 671-682.
- [11] Joseph, N., **T.R. Bonnell**, M. Dostie, L. Barrett, P. Henzi (2016) "Working the crowd: Sociable vervets benefit by reducing exposure to risk" *Behavioral Ecology*. 27 (4), 988-994.
- [10] Reyna-Hurtado, R., H. Beck, M. Altrichter, C.A. Chapman, **T. R. Bonnell**, A. Keuroghlian, A.L.J. Desbiez, J. Moreira, G. O’Farrill, J. Fragoso, and E. J. Naranjo. (2015). "What ecological and anthropogenic factors affect group size in white-lipped Peccaries (*Tayassu pecari*)?" *Biotropica*. 48 (2), 246-254.
- [9] Chapman, C.A., V.A.M. Schoof, **T.R. Bonnell**, J.F. Gogarten, and S. Calmé. (2015) "Competing pressures on populations: how disease may interact with food availability and stress



- to influence animal abundance.” *Philosophical Transaction of the Royal Society. B* 370, 20140112.
- [8] Gogarten J.F., **T.R. Bonnell**, L.M Brown, M. Campenni, M.D. Wasserman, and C.A. Chapman. (2014) "Increasing group size alters behaviour of a folivorous primate." *International Journal of Primatology* 35,590-608.
- [7] Jacob A.L., **T.R. Bonnell**, N. Dowhaniuk, and J. Hartter. (2014) “Topographic and spectral data resolve land cover misclassification to distinguish and monitor wetlands in western Uganda.” *ISPRS Journal of Photogrammetry and Remote Sensing* 94, 114-126.
- [6] **Bonnell, T.R.**, M. Campenni, C.A. Chapman, J.F. Gogarten, R.A. Reyna-Hurtado, J.A. Teichroeb, M.D. Wasserman, and R. Sengupta. (2014) “Emergent group level navigation: an agent-based evaluation of movement patterns in a folivorous primate.” *PLoS One* 8(10):e78264.
- [5] Chapman, C.A., **T.R. Bonnell**, R. Sengupta, T.L. Goldberg, and J.M. Rothman. (2013) “Is *Markhamia lutea*’s abundance determined by animal foraging?” *Forest Ecology and Management* 308, 62-66.
- [4] **Bonnell, T.R.**, P. Dutilleul, C.A. Chapman, R. Reyna-Hurtado, R. Sengupta, and U. Sarabia. (2013) “Analyzing small-scale aggregation in animal visits in space and time: the ST-BBD method.” *Animal Behaviour* 85 (2), 483-492.
- [3] Chapman, C.A., **T.R. Bonnell**, J.F. Gogarten, J.E. Lambert, P.A. Omeja, D. Twinomugisha, M.D. Wasserman, and J.M. Rothman. (2012) “Are primates ecosystem engineers?” *International Journal of Primatology* 34 (1), 1-14.
- [2] **Bonnell, T.R.**, R. Reyna-Hurtado, C. A. Chapman. (2011) “Post-logging recovery time is longer than expected in an East African tropical forest.” *Forest Ecology and Management* 261 (4), 855-864.
- [1] **Bonnell, T.R.**, R. Sengupta, C. A. Chapman, T. L. Goldberg (2010) “An agent-based model of red colobus resources and disease dynamics implicates key resource sites as hot spots of disease transmission.” *Ecological Modelling* 221 (20), 2491-2500.

## Electronic book

- [1] **Bonnell, T.R.** “Practical exercises in data science - PEDS” (<https://tbonne.github.io/peds>)

## Statistical Package Development

[1] **Bonnell, T.R.**, C. Vilette, J.D. Jarrett. “netTS: Extraction of network measures as time series.” (<https://github.com/tbonne/netTS>)

### **Conference Presentation** (\* denotes presenter, > denotes invited)

**Bonnell, T.R.\***, R. Michaud, A. Dupuch, V. Lesage, C. Chion (2023). “Estimating spatial mixing within the St. Lawrence Estuary beluga population” *Symposium béluga*: Montreal, Canada.

>**Bonnell, T.R.\***, C. Grueter (2023). “Memory keeps you at home and in a social group: mechanistic movement models of social network emergence.” *Canadian Society for Ecology and Evolution*: Winnipeg, Canada.

**Bonnell, T.R.\***, P. Henzi, L. Barrett (2019). “The social whirl: how individual interaction is both the shaper of, and is shaped by, social structure.” *Canadian Association for Physical Anthropology*: Banff, Canada

>**Bonnell, T.R.\***, P. Henzi, L. Barrett (2018). “Social Influences on Individual Movement and Their Foraging Consequences.” *Presented at the Canadian Society of Zoologists*: St-John’s, Newfoundland, Canada.

**Bonnell, T.R.\***, P. Henzi, L. Barrett, J. Bradbury, S. L. Vehrencamp (2018) “Functional social structures in mobile social groups: consequences of individual differences in social biases.” *The International Society for Behavioural Ecology*: Minneapolis, Minnesota, USA.

**Bonnell, T.R.\***, P. Henzi, L. Barrett (2016). “Extracting movement behaviour of individuals in groups with sparse data.” *Association of American Geographers*: 2016, San Francisco, California, USA.

**Bonnell, T.R.\***, P. Henzi, L. Barrett (2015). “Marching and meandering: individual behaviours leading to group level movement in baboons.” *American Society of Primatologist*: Bend, Oregon, USA.

**Bonnell, T.R.\***, R. Sengupta, C.A. Chapman & T.L. Goldberg (2015). “Linking Landscapes to Disease: An Agent-Based Model simulating the impact of forest composition on spread of disease in red colobus populations.” *Association of American Geographers*: New York, USA.

>**Bonnell, T.R.\***, C.A. Chapman (2013). “The synergy between nutrition, stress, and disease as determinants of animal abundance.” *Presented at the Canadian Society for Ecology and Evolution*: Kewlona, BC, Canada.

**Bonnell, T.R.\***, P.R. Dutilleul, C.A. Chapman, R. Sengupta, R. Reyna-Hurtado (2011). “Measuring spatial-temporal home range use using the beta-binomial distribution.” *Quebec center for Biodiversity Science*: Montreal, Quebec, Canada.

**Bonnell, T.R.\***, R. Sengupta, C.A. Chapman & T.L Goldberg (2011). “Linking Landscapes to Disease: An Agent-Based Model simulating the impact of forest composition on spread of disease in red colobus populations” *4th ICA Workshop on Geospatial Analysis and Modeling*: Simon Fraser University, Vancouver, BC, Canada.

**Bonnell, T.R.\***, R. Sengupta & C.A. Chapman (2011). “Spatial Epidemiology and GIS/ABM: a case study of the red colobus monkey.” *Spatial Knowledge and Information*: Ferney, BC, Canada.

**Bonnell, T.R.\***, C.A. Chapman & R. Sengupta (2010). “Red colobus foraging behaviour and its implications for the spread of disease.” *Société Québécoise pour l’Étude Biologique du Comportement*: Ste Anne de Bellevue, Quebec, Canada.

**Bonnell, T.R.\***, C.A. Chapman & R. Sengupta (2010). “Linking landscapes to disease: red colobus foraging behaviour and its implications for the spread of disease in logged forests.” *Quebec center for Biodiversity Science*: Montreal, Quebec, Canada.

## Teaching and Professional Contributions

### Teaching – Courses (3 credits)

- 2023 Methods and Statistics for Psychology A (PSYC 1030)  
Methods and Statistics for Psychology B (PSYC 2030)
- 2022 Methods and Statistics for Psychology B (PSYC 2030)  
Advanced Research Design and Data Analysis (PSYC 3400)  
Advanced Multilevel modeling (PSYC 4850)  
Introduction to Data Science with Python I (DASC 5010)  
Introduction to Data Science with Python II (DASC 5011)
- 2021 Methods and Statistics for Psychology B (PSYC 2030)  
Introduction to Data Science with Python (STAT 4850, 5850, 7850)
- 2020 Applied Bayesian Statistics (PSYC 4850, 5850)

### Teaching – Independent studies (3-credits)

- 2023 Applied statistical analysis of psychological data  
Guided readings: Statistical analysis of movement data





- 2022 Applied statistical analysis on media in consumer psychology  
Statistical analysis of psychosocial factors contributing to self-perceptions of competence

### Graduate Student Supervision

#### PhD Supervision

- Deanna Forrester, University of Lethbridge, 2012-2019. *The value of Children: Alloparenting in Samoa.*

#### PhD Committee member

- Tori Keeping, University of Lethbridge, 2023-Present. *Differences in adult speech: Do boy-directed and girl-directed speech exist?*
- Juleyska Vazquez Cardona, University of Lethbridge, 2023-Present. *The function of vocal performance in songbirds.*
- Virginia Shaw, University of Lethbridge, 2022-Present. *Slowed speech patterns.*
- Holly Bogard, University of Lethbridge, 2021-Present. *Transmission and development of scientific norms.*
- Leila Armstrong, University of Lethbridge, 2016-Present. *The art of urban ecology.*
- Chloé Vilette, University of Lethbridge, 2016-2023. *Rank, sociability and the determination of female vervet monkey reproductive success.*
- Rosemary Blersch, University of Lethbridge, 2017-2021. *Infectious disease and its transmission in vervet monkeys.*
- Christina Nord, University of Lethbridge, 2015-2021. *Dynamic networks and attention structure in vervet monkeys.*
- Jonathan Jarrett, University of Lethbridge, 2014-2019. *Vervet monkey development in life historical perspective.*

#### MSc. Committee member

- Sam Booth, University of Lethbridge, 2023-Present. *Study design and the replication crisis*
- Madison Clarke, University of Lethbridge, 2022-Present. *The Development of Cooperation in Juvenile Vervet Monkeys.*
- Narjes Delpisheh, 2021-2023. University of Lethbridge, *Text summarization*
- Juleyska Vazquez Cardona, University of Lethbridge, 2021-2023. *Warmup period in the Adelaide's warbler.*
- Samantha Krause, University of Lethbridge, 2018-2023. *The Function of Duets in a New World Warbler.*

## BSc. Student Supervision

- Nathan Dawson, 2021-Present. *RAFT data science project for data analysis and visualization along with database upkeep*

## Reviewer for Journal

*PLoS One, Animal Conservation, Behavioral Ecology, Animal Behaviour, Biotropica, Ecological Modelling, African Journal of Ecology, International Journal of Primatology, American Journal of Primatology, Remote Sensing Applications: Society and Environment, Movement Ecology, Landscape and Urban Planning, Behavioural Ecology and Sociobiology, Journal of Human evolution, Journal of Animal Ecology, Current Zoology.*

## **Funding / Awards**

2023-2028	NSF - DISES: Understanding invisible socio-environmental systems through pesticide exposure across human-wildlife interactions in tropical forest-agricultural mosaics	\$1.03 million
2022-2027	CIHR - Better Nights, Better Days for Canadians: An innovative national sustainable strategy to prevent and treat insomnia across the lifespan using digital approaches for sleep promotion, intervention, and provider training	\$1.35 million
2018-2023	Ministère des Forêts, de la Faune et des Parcs	\$20,000/yr
2015	American Association of Geographers: William L. Garrison Award for Best Dissertation in Computational Geography ( <i>Finalist</i> )	
2014-2020	Canadian Research Chair - allocations: Post-Doctoral Fellowship	\$49,999/yr
2014	FQRNT: Post-Doctoral Fellowship	\$65,000
2013	D. Stewart Memorial Fellowship	\$7,000
2012	Rathlyn GIS award	\$5,000
2011	FQRNT: Doctoral Fellowship	\$46,666