

Dr. David Alexander Campbell
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Impact Summary

Statistical Expertise: Statistical Computing, Machine Learning, Statistical Language Processing, Uncertainty Quantification, Functional Data Analysis, Markov Chain Monte Carlo Methods, Image Processing, Acoustic Time Series Data Analysis,...

Supervision of Personnel: 9 BSc, 8 MSc, 7 PhD, and 5 Post-Doctoral fellows

Research: 29 peer reviewed research papers, including 2 discussion papers, and over 60 invited talks in 8 countries

Data Science Leadership:

- Inaugural President, Data Science and Analytics Section of the Statistical Society of Canada
- Curriculum and program development in Data Science

External Funding: Over \$3.5M in research grants including National Science and Engineering Research Council 2019 Discovery Grant ranked in the top 10% for Statistics

Community Outreach: Co-organized the Vancouver Data Science Bi-Weekly Meetup Group. Organized regional and national Case Study Competitions

Roles

2021 -	Assistant Director, Data Science Applications, Bank of Canada
2019 -	Professor, Carleton University; School of Mathematics and Statistics and School of Computer Science
2019 - 2024	Adjunct Professor, Department of Statistics and Actuarial Science SFU
2017 - 2019	Coordinator, SFU Data Science Program
2013 - 2019	Associate Professor, Simon Fraser University
2013 - 2014	Visiting researcher, University of Manitoba Department of Statistics
2007 - 2013	Assistant Professor, Simon Fraser University

Education

2003 - 2007	PhD Statistics, McGill University, Canada
2002 - 2003	MSc Statistics, Dalhousie University, Canada
2002 B.Sc.	Environmetrics, Simon Fraser University, Canada

Peer Reviewed Publications

1. Carleton, W. C., Campbell, D., and Collard, M. (2021) "Rainfall, temperature, and Classic Maya conflict: A comparison of hypotheses using Bayesian time-series analysis", PLOS ONE
2. Wang, R.C.C. Campbell, D., Green, J., Cuperlovic-Culf, M. (2021) "Automatic 1D 1H NMR metabolite quantification for bioreactor monitoring", Metabolites
3. McDonald, S., Campbell, D. (2021) "A Review of Uncertainty Quantification for Density Estimation", Statistics Surveys, Vol. 15 (2021) 1–71, doi.org/10.1214/21-SS130
4. Baitz, H. A., Jones, P.W., Campbell, D., Jones, A.A., Gicas, K.M., Giesbrecht, C.J., Thornton, W.L., Barone, C.C., Wang, N. Y., Panenka, W.J., Lang, D.J., Vila-Rodriguez, F., Leonova, O., Barr, A.M., Procyshyn, R.M., Buchanan, T., Rauscher, A., Macewan, G.W., Honer, W.G. and Thornton, A.E. (2021) "Component processes of decision making in a community sample of precariously housed persons: associations with learning and memory, and health-risk behaviours", Frontiers in Psychology, doi: 10.3389/fpsyg.2021.571423
5. Carleton, W. C., Campbell, D., and Collard, M. (2021) "A reassessment of the impact of temperature change on European conflict during the second millennium CE using a bespoke Bayesian time-series model", Climatic Change, Vol 165
6. Chkrebtii, O., and Campbell, D. (2019) "Adaptive step-size selection for state-space based probabilistic differential equation solvers" Statistics and Computing
7. Stojkova, B. J. and Campbell, D., (2019) "Incremental Mixture Importance Sampling with Shotgun Optimization" Journal of Computational and Graphical Statistics, 28:4, 806-820, DOI: 10.1080/10618600.2019.1592756
8. Heeney, N.D., Habib, F., Brar, G., Krahn, G., Campbell, D., Sanatani, S., and V.E. Claydon, (2019) "Validation of Finger Blood Pressure Monitoring in Children", Blood Pressure Monitoring
9. Jodie-A. Warren, T.D. Pulindu Ratnasekera, David A. Campbell, Gail S. Anderson, (2018) "Hyperspectral measurements of immature *Lucilia sericata* (Meigen) (Diptera: Calliphoridae) raised on different food substrates" PLOS ONE <https://doi.org/10.1371/journal.pone.0192786>
10. Carleton, W.C., Campbell, D. and Collard, M. (2018) "Chronological uncertainty severely complicates the identification of cyclical processes in radiocarbon-dated time-series." Palaeogeography, Palaeoclimatology, Palaeoecology.
11. Carleton, W. C., Campbell, D. and M. Collard. (2018), "Radiocarbon dating uncertainty and the reliability of the PEWMA method of time-series analysis for research on long-term human-environment interaction" PLoS ONE 13(1): e0191055, doi:10.1371/journal.pone.0191055
12. Jodie-A. Warren, T.D. Pulindu Ratnasekera, David A. Campbell, Gail S. Anderson, (2017) "Initial investigations of spectral measurements to estimate the time within stages of *Protophormia terraenovae* (Robineau-Desvoidy) (Diptera: Calliphoridae)" Forensic Science International
13. Warren, Jodie-A, Ratnasekera, T. D. Pulindu, Campbell, David A, Anderson, Gail S, Rivers, David, Wallace, John R, "Spectral Signatures of Immature *Lucilia sericata* (Meigen) (Diptera: Calliphoridae)" Insects, 2017, Vol.8(2)
14. Carleton, W. C., Campbell, D., and Collard, M. (2017) "Increasing temperature exacerbated Classic Maya conflict over the long term" Quaternary Science Reviews

15. Chkrebtii, O., Campbell, D., Calderhead, B., Girolami, M. (2016) "Bayesian Solution Uncertainty Quantification for Differential Equations", *Bayesian Analysis* (Discussion paper with rejoinder) 11(4) 1239-1299
16. Golchi, S. and Campbell, D. (2016) "Sequentially Constrained Monte Carlo", *Computational Statistics and Data Analysis*, vol. 97
17. Lo, J., Campbell, D., Kennedy, C, Gobas, F. (2015) "Somatic and Gastro-Intestinal In-Vivo Biotransformation Rates of Hydrophobic Chemicals in Fish" *Environmental Toxicology and Chemistry*.
18. Justin C. Lo, Daniel J. Letinski, Thomas F. Parkerton, David A. Campbell, and Frank A. P. C. Gobas (2015) "In Vivo Biotransformation Rates of Organic Chemicals in Fish: Relationship with Bioconcentration and Biomagnification Factors", *Environmental Science & Technology* doi: 10.1021/acs.est.6b03602
19. Justin C. Lo, Gayatri N. Allard, S. Victoria Otton, David A. Campbell and Frank A.P.C. Gobas (2015) "Concentration dependence of biotransformation in fish liver S9: Optimizing substrate concentrations to estimate hepatic clearance for bioaccumulation assessment" *Environmental Toxicology and Chemistry* doi:10.1002/etc.3117
20. Golchi, S. Bingham, D., Chipman, H., Campbell, D. (2015) "Monotone Function Estimation for Computer Experiments" *Journal of Uncertainty Quantification*
21. Cameron, E., Chkrebtii, O., Campbell, D., Bayne, E. (2015) "Trans-Dimensional Approximate Bayesian Computation for inference on models of invasive species" *Computational Statistics and Data Analysis*
22. Carleton, W. C., Campbell, D., and Collard, M. (2014) "A Reassessment of the Impact of Drought Cycles on the Classic Maya." *Quaternary Science* 105 doi:10.1016/j.quascirev.2014.09.032.
23. Campbell, D., and Subhash L. (2013) "An ANOVA Test for Parameter Estimability Using Data Cloning with Application to Statistical Inference for Dynamic Systems." *Computational Statistics and Data Analysis* doi:10.1016/j.csda.2013.09.013.
24. Campbell, D., Chkrebtii, O. (2013) "Maximum Profile Likelihood Estimation of Differential Equation Parameters through Model Based Smoothing State Estimates", *Mathematical Biosciences*, doi:10.1016/j.mbs.2013.03.011
25. Campbell, D., Hooker, G., McAuley, K. (2012), "Parameter Estimation in Differential Equation Models With Constrained Variables", *Journal of Chemometrics* (doi: 10.1002/cem.2416)
26. Lee, Y.S., Otton, S. V., Campbell, D. A., Moore, M., Kennedy, C. J., Gobas, F. A., (2011) "Measuring in-vitro Biotransformation Rates of Super Hydrophobic Chemicals in Rat Liver S9 Fractions Using Thin-Film Sorbent-Phase Dosing" *Environmental Science & Technology* doi:10.1021/es203338h
27. Campbell, D. and Steele, R. (2011), "Smooth Functional Tempering for Nonlinear Differential Equation Models", *Statistics and Computing*, doi:10.1007/s11222-011-9234-3
28. Hutchins, S. and Campbell, D. (2009), "Estimating the Time to Reach a Target Frequency in Singing" *Annals of the New York Academy of Sciences*, Volume 1169, Number 1, July 2009, pp. 116-120
29. Ramsay, J. O., Hooker, G., Campbell, D., and Cao, J. (2007), "Parameter Estimation for Differential Equations: A Generalized Smoothing Approach (with Discussion)," *Journal of the Royal Statistical Society Series B*, 69, 741-796.

Non-Refereed Works

- Campbell, D. (2010) Discussion for “Riemann manifold Langevin and Hamiltonian Monte Carlo methods” by Girolami and Calderhead, J. R. Statist. Soc. B (2011) 73, Part 2, pp. 1–37
- Campbell, D. (2009) Biometrics book review of "Simulation and Inference for Stochastic Differential Equations with R Examples" 65(1) p 336
- D. Campbell, J. Cao, G. Hooker, and J. Ramsay, (2008) "Parameter Cascading for High Dimensional Models", chapter in "Functional and Operational Statistics" edited by Sophie Daro-Niang and Frédéric Ferraty, Springer

Select Invited Talks

1. Feb 2020 “Solving Statistical Multimodality By Exploiting Structure”, McGill University Biostatistics Seminar
2. Apr 2019 “Data, Statistics, and Mathematical Modelling: a Significant Merger” BC Centre for Disease Control, Machine Learning for Precision Public Health Seminar
3. Nov 2018 “Testing for Statistical Identifiability” BIRS, meeting on Mathematical and Statistical Challenges in Bridging Model Development, Parameter Identification and Model Selection in the Biological Sciences
4. Aug 2017 “New Perspectives on State Space Models” Workshop on State Space Models, Casa Mathematica Oaxaca Mexico
5. Feb 2016 California Institute of Technology Department of Computational and Mathematical Science seminar “Probabilistic Numerics and Solving Differential Equation”
6. June 2012 Laboratoire Statistique et Génome, Université d'Evry, France, Seminar, “Parameter Estimability and Statistical Inference for Dynamical Systems using Data Cloning”
7. Dec 2010 Meeting of the International Chinese Statistical Association, Guangzhou China “The Role of Functional Data Analysis in Bayesian Model Selection.”
8. Dec 2008 International Association for Statistical Computing World Conference, Yokohama, Japan. “Bayesian Collocation Tempering for Nonlinear Differential Equation Models: Using Functional Data Methods to Improve Bayesian Inference”

Select Service to the Data Science Community

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| 2020- 2021 | Past-President, SSC Data Science and Analytics Section |
| 2019- 2020 | President, SSC Data Science and Analytics Section |
| 2019- 2022 | Canadian Statistical Sciences Institute Provincial Advisory Committee Member |
| 2019 | Ministry of Education Degree Quality Assessment Board panelist for a Master of Science in Data Science proposal |
| 2016 - 2022 | ASA / SIAM Journal of Uncertainty Quantification, Associate Editor |
| 2016 - 2022 | SSC Public Relations Officer, SSC Executive and SSC Board member |
| 2015 - 2019 | Co-organizer Learn Data Science Meetup Group
https://www.meetup.com/LearnDataScience/events/ |