Ailene MacPherson

Address 8888 University Drive. Burnaby, BC. V5A 1S6 Canada
E-mail ailenem@sfu.ca
Website https://amacp.github.io/

Positions

Assistant Professor *Simon Fraser University* 2021-*current*
Infectious Disease Modelling and Estimation
Canada Research Chair (Tier II) in Theoretical Evolutionary Epidemiology

PDF *University of Toronto* 2020-2021
EEB Postdoctoral fellow

Ph.D. Zoology *University of British Columbia* 2015-2020
Thesis: Coevolutionary Epidemiology: a population genetic exploration of evolutionary interactions between hosts and their infectious pathogens
Advisor: Sarah P. Otto

MSc. Bioinformatics and Computational Biology *University of Idaho* 2013-2015
Thesis: Estimating the Strength of Natural Selection from Parallel Evolution
Advisor: Scott L. Nuismer

BSc. *summa cum laude* Mathematics *University of Idaho* 2010-2013

Publications

- Liu, P., Song, Y., Colijn, C., **MacPherson, A.**, 2022. The impact of sampling bias on viral phylogeographic reconstruction. *PLoS Global Public Health*
- **MacPherson, A.**, Wang, S., Yamaguchi, R., Rieseberg, L.H, Otto, S.P., 2022. Parental Population Range Expansion Before Secondary Contact Promotes Heterosis. *The American Naturalist*
- Wang S., Nalley M.J., Chatla K., Aldaimalani R., **MacPherson A.**, Wei K., Corbett R., Mai D., Bachtrog D., 2022. Neo-sex chromosome evolution shapes sex-dependent asymmetrical introgression barrier. *PNAS*
- **MacPherson, A.**, Louca, S., McLaughlin A., Joy, J.B., Pennell, M.W., 2021. Unifying Phylogenetic Birth-Death Models in Epidemiology and Macroevolution. *Syst. Biol.*
- Louca, S., McLaughlin A., **MacPherson, A.**, Joy, J.B., Pennell, M.W., 2021. Fundamental identifiability limits in molecular epidemiology. *Mol. Biol. Evol.*
- **MacPherson, A.**,Keeling M.J., Otto, S.P., 2021. Feedback between coevolution and epidemiology can help or hinder the maintenance of genetic variation in host-parasite models. *Evolution*
- **MacPherson, A.**,Keeling M.J., Otto, S.P., 2020. Coevolution fails to maintain genetic variation in a host-parasite model with constant finite population size. *Theor. Popul. Biol.*
- **MacPherson, A.**, Otto, S.P., Nuismer, S.L., 2018. Keeping pace with the Red Queen: Identifying the genetic basis of susceptibility to infectious disease. *Genetics*
- **MacPherson, A.**, Otto, S.P., 2018. Joint coevolutionary-epidemiological models dampen Red Queen cycles and alter conditions for epidemics. *Theor. Popul. Biol.*
- **MacPherson, A.**, Nuismer, S.L., 2017. The probability of parallel genetic evolution from standing genetic variation. *J. Evol. Biol*
- **MacPherson, A.**, Hohenlohe, P.A., Nuismer, S.L., 2015. Trait dimensionality explains widespread variation in local adaptation. *Proc. R. Soc. Lond. B.*
- Nuismer, S.L., **MacPherson, A.**, Rosenblum, E.B., 2012. Crossing the threshold: gene-flow, dominance and the critical level of standing genetic variation required for adaptation to novel environments. *J. Evol. Biol*

• Balemba, O.B., Stenkamp-Strahm, C.H., Cady, J., **MacPherson, A.**, 2011. High-fat diet-induced neuropathy of enteric nervious ssystem and the effect of Alpha-7 Nicotinic Acetylcholine receptoragonist, DMAB-Anabaseine Dihydrochloride. *Gastroenterology*

Preprint/In Review

• Peters, M.A.E., Mideo, N., **MacPherson, A.**, in review. The maintenance of genetic diversity under host-parasite coevolution in finite, structured populations. *Evolution*

• Clancy, E., **MacPherson, A.**, Cheek, R.G., Mouton, J.C., Sillett T.S., Chalambor, C.K, Funk, W.C., Hohenlohe, P.A., in review. Unraveling Adaptive Evolutionary Divergence at Microgeographic Scales. *The American Naturalist*

Students and Thesis Committees

Co-advised Graduate Students:

Yexuan Song (Jan 2022–Aug 2022) MSc., *Thesis:* Accounting for sampling bias in ancestral state reconstruction

Committee Member:

Mina Moeini (2021–*current*) MSc., *Thesis:* TBD

Rituparna Banerjee (2022–*current*) PhD, *Thesis:* TBD

Presentations and Posters

Invited Talks:

Workshop: *Do host-parasite interactions maintain immune diversity?.*
IMMREP, *Virtual* (July 2022)

Workshop: *Allele surfing: hybridization and the evolution of life-history traits.*
Fields Institute Workshop on Range Dynamics, *Virtual* (June 2022)

Talk: *Parental population expansion promotes heterosis in secondary contact hybrid zones.*
PEQG22, *Pacific Grove, CA* (June 2022)

Talk: *Limitations to Inference in a General Phylodynamic Model.*
JMM, *Virtual* (April 2022)

Workshop: *Eco-evolutionary maintenance of genetic variation.*
Eco-evolutionary modelling, *Paris, France* (March 2022)

Talk: *Limitations to inference in a general phylodynamic model.*
AMS Special Session, *Seattle, WA* (January 2022)

Seminar: *Coevolution between hosts and their infectious pathogens.*
Max Plank Institute, *Virtual* (May, 2020)

Workshop: *Identifying the genetic basis of Coevolution.*
ESEB-STN, *Freising, Germany* (March, 2019)

Conferences:

Talk: *Coevolution does not maintain genetic variation.* ASN, (2020)

Poster: *Dynamics of Coinfection by Distantly Related Pathogens.* ESEB, (2018)

Poster: *Density-dependent selection in finite populations.* Evo-WIBO, (2018)

Talk: *Finding disease genes in the face of the Red Queen.* Evolution, (2017)

Talk: *Epidemiological dynamics disrupt Red Queen cycles.* CSEE, (2017)

Poster: *A Marriage of the Red Queen to SIR Red King.* Evo-WIBO, (2016)

Talk: *Natural Selection and Probability of Parallel Evolution.* Evolution, (2015)

Talk: *Trait dimensionality and local adaptation.* Evo-WIBO, (2014)

Poster: *Trait dimensionality and local adaptation.* Evolution, (2013)

Poster: *Crossing the threshold: dominance and adaptation to novel environments.* Evo-WIBO, (2012)

Funding and Awards

James F. Crow Early Career Award Genetic Society of America (2022)	
Tier II Canada Research Chair (2022-2027)	100,000 CAD/Year
NSERC Discovery Grant-ECR (2022-2027)	29,000 CAD/Year
NSERC Launch Supplement (2021)	12,000 CAD
EEB Postdoctoral Fellowship University of Toronto (2020)	55,000 CAD/Year
Graduate Fellowship American Association of University Women (2019)	20,000 USD
Zoology Graduate Fellowship University of British Columbia Zoology (2019)	15,000 CAD (Declined)
Godfrey Hewitt Mobility Award European Society of Evolutionary Biology (2018)	1,500 Euro
Zoology Four-Year Fellowship University of British Columbia Zoology (2015-2018)	15,000 CAD/Year
BCB Graduate Research Fellowship University of Idaho (2013-2015)	21,000 USD/Year
Outstanding Senior in Mathematics University of Idaho (2015)	500 USD
College of Science Dean's Award University of Idaho (2015)	200 USD

Teaching

2022*: *Mathematical Epidemiology*: Professor. SFU.
2021*: *Calculus for Biologists*: Professor. SFU.
2021: *Evolutionary Medicine*: Guest Lecturer. U of T.
2020: *Phylogenetics*: Teaching Assistant. UBC.
2019: *Population Genetics*: Grader. UBC.
2018: *Biostatistics*: Teaching Assistant. UBC.
2017: *Parasitology*: Teaching Assistant. UBC.
2019, 2017: *Biomathematics*: Guest Lecturer. UBC.
2016: *Evolutionary Ecology*: Teaching Assistant. UBC.
2015: *Biomathematics*: Teaching Assistant. UBC.
2008-2009: *Calculus I,II, and Differential Equations*: Grader. U of I.

*courses developed including syllabi, lectures, & assignments

Professional Activities

Peer Reviews:	Evolution ($\times$1), Genetics ($\times$3), J. Theor. Biol. ($\times$2), Am. Nat. ($\times$3), Proc. R. Soc. Lond. B ($\times$2), Phil. Trans. R. Soc. B ($\times$2), J. Mol. Evol. ($\times$1), Virus Evol. ($\times$1), Trends Genet. ($\times$1), PLoS Genet. ($\times$1)
Working Groups:	UBC Biodiversity: Linking Macroevolution and Epidemiology (2020)
University Service:	Zoology Graduate Student Association–President V.M. Srivastava Women in Science Memorial Fund–Committee member
Outreach:	University of Toronto-EEB Modelling Club Managing Fisheries with Math–Grade 12 *Palmer H.S., Palmer, Alaska* Researchers Revealed Video Series: "Counting on it" https://www.youtube.com/watch?v=Kz5nRY84rAs Let's Talk Science-Volunteer Idaho Women in STEM K-12 Program-Volunteer
Media	BCIT News 29/9/21 Citynews Vancouver 27/12/21