

# Ailene MacPherson

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## Positions

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<b>Assistant Professor</b> <i>Simon Fraser University</i>	2021-current
Infectious Disease Modelling and Estimation	
Canada Research Chair (Tier II) in Theoretical Evolutionary Epidemiology	
<b>PDF</b> <i>University of Toronto</i>	2020-2021
EEB Postdoctoral fellow	
<b>Ph.D. Zoology</b> <i>University of British Columbia</i>	2015-2020
Thesis: Coevolutionary Epidemiology: a population genetic exploration of evolutionary interactions between hosts and their infectious pathogens	
Advisor: Sarah P. Otto	
<b>MSc. Bioinformatics and Computational Biology</b> <i>University of Idaho</i>	2013-2015
Thesis: Estimating the Strength of Natural Selection from Parallel Evolution	
Advisor: Scott L. Nuismer	
<b>BSc. <i>summa cum laude</i> Mathematics</b> <i>University of Idaho</i>	2010-2013

## Publications

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- **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* (*accepted*)
  - 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* (*in print*)
  - **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 nervous system and the effect of Alpha-7 Nicotinic Acetylcholine receptor agonist, DMAB-Anabaseine Dihydrochloride. *Gastroenterology*

## Students and Thesis Committees

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### Co-advised Graduate Students:

Yexuan Song (2022–current) MSc., Thesis: TBD

### Committee Member:

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

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

## Presentations and Posters

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### Invited Talks:

*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

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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

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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

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