

# 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	
<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., 2020. Parental Population Range Expansion Before Secondary Contact Promotes Heterosis. *Conditionally accepted: The American Naturalist*
  - **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*

### Pre-print:

- Wang S., Nalley M.J., Chatla K., Aldaimalani R., **MacPherson A.**, Wei K., Corbett R., Mai D., Bachtrog D., 2021. Neo-sex chromosome evolution shapes sex-dependent asymmetrical introgression barrier. *bioRxiv*

## Advising and Committee

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

## Presentations and Posters

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### Invited Talks:

*Workshop: Eco-evolutionary models of host-parasite coevolution.*  
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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<i>EEB Postdoctoral Fellowship</i> University of Toronto (2020)	55,000 CAD/Year
<i>Graduate Fellowship</i> American Association of University Women (2019)	20,000 USD
<i>Zoology Graduate Fellowship</i> University of British Columbia Zoology (2019)	15,000 CAD (Declined)
<i>Godfrey Hewitt Mobility Award</i> European Society of Evolutionary Biology (2018)	1,500 Euro
<i>Zoology Four-Year Fellowship</i> University of British Columbia Zoology (2015-2018)	15,000 CAD/Year
<i>BCB Graduate Research Fellowship</i> University of Idaho (2013-2015)	21,000 USD/Year
<i>Outstanding Senior in Mathematics</i> University of Idaho (2015)	500 USD
<i>College of Science Dean's Award</i> University of Idaho (2015)	200 USD

## Teaching

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2021: *Calculus for Biologists*: Professor. SFU.

Contributions: Lecture development, assignment development

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.

## 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), J. Mol. Evol. (×1), Virus Evol. (×1), Trends Genet. (×1)
<b>Working Groups:</b>	UBC Biodiversity: Linking Macroevolution 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="https://bcitnews.com/2021/09/29/how-does-covid-19-virus-mutate/">https://bcitnews.com/2021/09/29/how-does-covid-19-virus-mutate/</a>