

Marysa M. Laguë, PhD

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Department of Earth & Planetary Science
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Research Interests

Land-atmosphere interactions. Terrestrial surface energy budget. Climate dynamics. Earth system modeling & idealized modeling. Land use impacts on the climate system. Atmospheric feedbacks. Vegetation impacts on the hydrologic cycle.

Current Position

2019-PRESENT **James S. McDonnell Foundation Postdoctoral Fellow in Dynamic and Multiscale Systems**

2019-PRESENT University of California, Berkeley
Department of Earth & Planetary Science
Berkeley, CA, USA
Host: Dr. William Boos

2020-PRESENT Visiting Research Fellow, Coldwater Lab
University of Saskatchewan Center for Hydrology
Canmore, Alberta, Canada
Host: Dr. Martyn Clark

Education

2019 PhD, Atmospheric Sciences
University of Washington
Seattle, WA, USA
Department of Atmospheric Sciences
Advisor: Dr. Abigail Swann
Supervisory committee: Abigail Swann, Gordon Bonan, Cecilia Bitz, David Battisti,
Dargan Frierson, Gerard Roe
Dissertation: *Quantifying the role of individual surface properties on atmospheric feedbacks and land-atmosphere interactions*

2018 MSc, Applied Mathematics
University of Washington
Seattle, WA, USA

2016 MSc, Atmospheric Sciences
University of Washington
Seattle, WA, USA
Thesis: *Progressive Mid-latitude Afforestation: Local and Remote Climate Impacts in the Framework of Two Coupled Earth System Models*

2013 BSc, Honours Mathematics
University of British Columbia
Vancouver, BC, Canada

Publications

M. M. Laguë, M. Pietschnig, S. Ragen, T. Smith, D. S. Battisti. Terrestrial evaporation and global climate: lessons from Northland, a planet with a hemispheric continent. *In Press*. Journal of Climate, 2020. EarthArXiv Preprint. DOI: 10.1175/JCLI-D-20-0452.1.

A. J. Rushby, A. L. Shields, E. T. Wolf, **M. M. Laguë**, A. Burgasser. The Effect of Land-Albedo Feedback on the Climate of Land-Dominated Planets in the TRAPPIST-1 System. *The Astrophysical Journal*, 2020. DOI:10.3847/1538-4357/abbe04. ArXiv Preprint.

L. Boysen, V. Brovkin, J. Pongratz, D. Lawrence, P. Lawrence, N. Vuichard, P. Peylin, S. Liddicoat, T. Hajima, Y. Zhang, M. Rocher, C. Delire, R. Stéférián, V. Arora, L. Nieradzic, P. Anthoni, W. Thiery, **M. M. Laguë**, D. Lawrence, M. Lo. Global climate response to idealized deforestation in CMIP6 models. *Biogeosciences*, 2020. DOI: 10.5194/bg-2020-229.

F. Tromboni, J. Liu, E. Ziaco, D. Breshears, K. Thompson, W. Dodds, K. Dahlin, E. La Rue, J. Thorp, Andrés Viña, **M. M. Laguë**, A. Maasri, H. Yang, S. Chandra, S. Fei. Macrosystems as metacoupled human and natural systems. *In Press*, *Frontiers in Ecology*, 2020.

C. M. Zarakas*, A. L. S. Swann, **M. M. Laguë**, K. C. Armour, J. T. Randeron. Plant Physiology Increases the Magnitude and Spread of the Transient Climate Response in CMIP6 Earth System Models. *Journal of Climate*, 2020. DOI: 10.1175/JCLI-D-20-0078.1; EarthArXiv Preprint EMGXB.

***Graduate student co-advised by M. M. Laguë & A. L. S. Swann**

J. Kim*, **M. M. Laguë**, S. Pennypacker, E. Dawson*, A. L. S. Swann. Evaporative Resistance is of Equal Importance as Surface Albedo in High Latitude Surface Temperatures Due to Cloud Feedbacks. *Geophysical Research Letters*, 47. e2019GL085663 DOI: 10.1029/2019GL085663; EarthArXiv Preprint S5M4U.

***Undergraduate student co-advised by M. M. Laguë & A. L. S. Swann**

M. M. Laguë Quantifying the role of individual surface properties in atmospheric feedbacks and land-atmosphere interactions. University of Washington. 2019. ProQuest PhD Dissertation.

M. M. Laguë, G. B. Bonan, and A. L. S. Swann. Separating the impact of individual land surface properties on the terrestrial surface energy budget in both the coupled and un-coupled land-atmosphere system. *J. Climate*, 32, 5725-5744, 2019. DOI: 10.1175/JCLI-D-18-0812.1.

A. L. S. Swann, **M. M. Laguë**, E. S. Garcia, J. P. Field, D. D. Breshears, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villegas, D. J. Law, and D. M. Minor. Continental-scale consequences of tree die-offs in North America: identifying where forest loss matters most. *Environmental Research Letters*, 13(5): 55014, 2018. DOI: 10.1088/1748-9326/aaba0f.

M. M. Laguë and A. L. S. Swann. Progressive Mid-latitude Afforestation: Impacts on Clouds, Global Energy Transport, and Precipitation. *Journal of Climate*, 29(15):5561?-5573, 2016. DOI: 10.1175/JCLI-D-15-0748.1.

M. Laguë, N. Tania, J. Heath, and L. Edelstein-Keshet. The effects of facilitation and competition on group foraging in patches. *Journal of Theoretical Biology*, 310:88?96, 2012. ISSN 00225193. DOI: 10.1016/j.jtbi.2012.06.024.

Publications Submitted

M. M. Laguë, A. L. S. Swann, William R. Boos. Feedbacks on zonal mean tropical precipitation shifts induced by land surface change. *Submitted to Journal of Climate*, 2020. EarthArXiv Preprint.

Completed manuscripts awaiting co-author feedback

Copies of these manuscripts can be provided upon request.

M. M. Laguë, G. B. Bonan, D. Lawrence, A. L. S. Swann. Separating the effect of historical vegetation change into the effects of albedo, Bowen ratio, and vegetation height changes.

Honours and Awards

Bold entries indicate awards from National or International competitions.

- 2019 **Community Earth System Model 2019 Graduate Student Award, *National Center for Atmospheric Research*. <http://www.cesm.ucar.edu/about/awards/2019.html>**
- 2018-present **James S. McDonnell Foundation Postdoctoral Fellowship in Understanding Dynamic and Multi-scale Systems (Active Fellow from Fall 2019 - present)**
- 2016-2019 **National Science and Engineering Research Council of Canada Postgraduate Studies Doctoral Fellowship**
- 2018 Andrew Slater Award for best student or postdoc presentation (Land Model Working Group Meeting), *National Center for Atmospheric Research*
- 2017 Husky 100 Award, *University of Washington*
- 2017 3rd Place, Peter B. Wagner Memorial Award for Women in Atmospheric Sciences
- 2016 Advanced Studies Program (ASP) Visiting Graduate Student Award, *National Center for Atmospheric Research*
- 2013-2014 **National Science and Engineering Research Council of Canada Alexander Graham Bell Canadian Graduate Studies Fellowship/Postgraduate Studies Fellowship**
- 2013 Rotary Youth Leadership Award, *Rotary International, District 5080*
- 2011 Undergraduate Student Research Award (Dept. of Mathematics), *University of British Columbia*
- 2009-2012 Chancellor's Scholarship, *University of British Columbia*
- 2010 Trek Excellence Scholarship, *University of British Columbia*
- 2009 President's Scholarship, *University of British Columbia*
- 2009 Columbia Power Corporation Scholarship
- 2009 Chevron Canada/Molnar Bursary
- 2008 Premier's Excellence Award, Government of British Columbia (for the top graduating high school students in the province)
- 2008 BC Innovation Council / BC Science Teachers' Association Award
- 2008 Cranbrook Lion's Club Scholarship
- 2008 Tembec University Studies Scholarship
- 2008 Dogwood District/Authority Award
- 2008 Scholastic Distinction Scholarship (College of the Rockies)
- 2008 Joanne McWhirter/Helton Scholarship for Physics
- 2008 British Columbia Provincial Scholarship Award
- 2008 Top Academic Graduate Award, Mount Baker Senior Secondary

Presentations

<i>Invited Talk</i>	Center for Hydrology, University of Saskatchewan, <i>Virtual / Coldwater Lab, Canmore, Alberta, Canada</i>	2020
<i>Invited Talk</i>	American Geophysical Union Fall Meeting, <i>Virtual / San Francisco, CA, USA</i>	2020
<i>Poster</i>	American Geophysical Union Fall Meeting, <i>Virtual / San Francisco, CA, USA</i>	2020
<i>Invited Talk</i>	Department of Atmospheric Sciences Seminar, University of Illinois at Urbana-Champaign, <i>Champaign, IL, USA</i>	2020
<i>Invited Talk</i>	Stanford University CLimate, Atmosphere and Ocean Dynamics (CLAOD) Seminar, Stanford University, <i>Stanford, CA, USA</i>	2020
<i>Poster</i>	Berkeley Atmospheric Sciences Center (BASC) Symposium, University of California, Berkeley <i>Berkeley, CA, USA</i>	2020
<i>Poster</i>	American Geophysical Union Fall Meeting, <i>San Francisco, CA, USA</i>	2019
<i>Invited Talk</i>	Department of Earth & Climate Science Distinguished Speaker Series, San Francisco State University, <i>San Francisco, CA, USA</i>	2019
<i>Invited Instructor</i>	Advanced Climate Dynamics Courses (ACDC, 2 lectures), <i>Yosemite, CA, USA</i>	2019
<i>Invited Talk</i>	Aspen Global Change Institute Land Use Meeting, <i>Snowmass, CO, USA</i>	2019
<i>Invited Talk</i>	24th Annual Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO, USA</i>	2019
<i>Invited Talk</i>	Seminar, Max Planck Institute for Meteorology, <i>Hamburg, Germany</i>	2019
<i>Invited Talk</i>	Seminar, Department of Earth & Planetary Science, University of California, Berkeley, <i>Berkeley, CA, USA</i>	2019
<i>Invited Talk</i>	Seminar, Department of Earth System Science, University of California, Irvine, <i>Irvine, CA, USA</i>	2019
<i>Invited Talk</i>	Climate & Global Dynamics Seminar, National Center for Atmospheric Research, <i>Boulder, CO, USA</i>	2019
<i>Invited Talk</i>	American Geophysical Union Fall Meeting, <i>Washington, D.C., USA</i>	2018
<i>Talk</i>	Advanced Climate Dynamics Courses Summer School, <i>Finse, Norway</i>	2018
<i>Talk</i>	23rd Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO</i>	2018
<i>Talk</i>	UW Program on Climate Change Spring Symposium, University of Washington, <i>Seattle, WA</i>	2018
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2018
<i>Poster</i>	National Science Foundation Macrosystems Biology PI Meeting, <i>Washington, DC</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting, <i>New Orleans, LA</i>	2017
<i>Invited Talk</i>	Ecological Society of America Annual Meeting, <i>Portland, OR</i>	2017
<i>Talk</i>	Atmospheric Climate and Dynamics Seminar, UW Dept. of Atmospheric Sciences, <i>Seattle, WA</i>	2017
<i>2 Talks</i>	22nd Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Boulder, CO</i>	2017
<i>Talk</i>	UW Program on Climate Change Spring Symposium, University of Washington, <i>Seattle, WA</i>	2017
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2017
<i>Poster</i>	10th Annual Graduate Climate Conference, <i>Pack Forest, WA</i>	2016

<i>Invited Talk</i>	National Oceanographic and Atmospheric Administration (NOAA), <i>Boulder, CO</i>	2016
<i>Talk</i>	21st Community Earth System Model Workshop, National Center for Atmospheric Research, <i>Breckenridge, CO</i>	2016
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2016
<i>Talk</i>	American Geophysical Union Fall Meeting, <i>Seattle, WA</i>	2015
<i>Talk</i>	Master's Defense, University of Washington, <i>San Francisco, CA</i>	2015
<i>Poster</i>	9th Annual Graduate Climate Conference, <i>Woods Hole, MA</i>	2015
<i>Talk</i>	Graduate Student Seminar, Program on Climate Change, University of Washington, <i>Seattle, WA</i>	2015
<i>Talk</i>	Land Model Working Group Meeting, National Center for Atmospheric Research, <i>Boulder, CO</i>	2015
<i>Talk</i>	8th Annual Graduate Climate Conference, <i>Pack Forest, WA</i>	2014
<i>Talk</i>	Undergraduate Student Research Award Seminar, University of British Columbia, <i>Vancouver, BC, Canada</i>	2012
<i>Poster</i>	Applied Mathematics Perspectives Mathematical Biology Workshop, University of Victoria, <i>Victoria, BC, Canada</i>	2012

Co-authored Presentations

<i>Talk</i>	American Geophysical Union Fall Meeting: "Modeling Boreal Forest Expansion as a Driver of Accelerated Warming and Deglaciation following the Last Glacial Maximum" by G. Shum, A. L. S. Swann, M. M. Laguë . <i>Virtual / San Francisco, CA, USA</i>	2020
<i>Poster</i>	American Geophysical Union Fall Meeting: "How Much Does Plants' Response to Elevated CO ₂ Influence the Transient Climate Response?" by C. Zarakas, M. M. Laguë , J. T. Randerson, K. Armour, A. L. S. Swann. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	American Geophysical Union Fall Meeting: "Can land management alter ecoclimate teleconnections across North America in the face of forest die-off?" by X. Feng, Abigail L. S. Swann, D. D. Breshears, M. M. Laguë , J. P. Field, D. Law, A. Lien, T. Huang, J. Debridge, E. Baldwin, J. R. Soto, L. Lopez-Hoffman. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	American Geophysical Union Fall Meeting: "Can land management alter ecoclimate teleconnections across North America in the face of forest die-off?" by X. Feng, Abigail L. S. Swann, D. D. Breshears, M. M. Laguë , J. P. Field, D. Law, A. Lien, T. Huang, J. Debridge, E. Baldwin, J. R. Soto, L. Lopez-Hoffman. <i>San Francisco, CA, USA</i>	2019
<i>Talk</i>	The Future of Earth System Modeling: Biosphere and Land Surfaces (Caltech) "Flexible Complexity as a Tool for Understanding the Role of Land in the Earth System" by Abigail L. S. Swann, M. M. Laguë , G. B. Bonan. <i>Pasadena, CA, USA</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting: "Continental-scale consequences of tree die-offs in North America" by Abigail L. S. Swann, M. M. Laguë , E. S. Garcia, J. P. Field, D. D. Breshears, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villegas, D. Law, D. Minor. <i>Washington, DC, USA</i>	2018
<i>Talk</i>	American Geophysical Union Fall Meeting: "Quantifying the role that terrestrial ecosystems play in Earth's climate" by Abigail L. S. Swann, M. M. Laguë , M. Kovenock. <i>Washington, DC, USA</i>	2018
<i>Poster</i>	American Geophysical Union Fall Meeting: "Evaporative Resistance Equally Important as Albedo in High Latitudes Due to Cloud Feedbacks" by J. Kim, M. M. Laguë , E. J. Dawson, A. L. S. Swann. <i>Washington, DC, USA</i>	2018

- Poster* NSF Macrosystems Biology PI Meeting: “Ecoclimate Teleconnections” by A. L. S. Swann, **M. M. Laguë***, E. S. Garcia, D. D. Breshears*, J. P. Field, D. J. P. Moore, S. R. Saleska, S. C. Stark, J. C. Villeas, D. J. Law, D. M. Minor. *Washington, DC, USA*
*Presenting Authors. Note: this entry is co-listed in “Presentations” 2018
- Talk* American Geophysical Union Fall Meeting: “Does climate care about land?” by E. J. Dawson, **M. M. Laguë**, A. L. S. Swann. *New Orleans, LA, USA* 2017
- Talk* American Geophysical Union Fall Meeting: “Predicting Tree Mortality Die-off Events Associated with Hotter Drought and Assessing Their Global Consequences via Ecoclimate Teleconnections” by D. D. Breshears, C. D. Allen, N. G. McDowell, H. D. Adams, M. Barnes, G. Barron-Gafford, J. B. Bradford, N. Cobb, J. P. Field, R. Froend, J. B. Fontaine, E. S. Garcia, G. E. St. J. Hardy, T. E. Huxman, J. Kala, **M. M. Laguë**, A. Martinez-Yrizar, G. Matusick, D. M. Minor, D. J. P. Moore, M. Ng, K. X. Ruthrof, S. R. Saleska, S. C. Stark, A. L. S. Swann, J. C. Villegas, A. P. Williams, C. Zou. *New Orleans, LA, USA* 2017

Teaching Experience

- 2020 WESTERN WASHINGTON UNIVERSITY
Guest Lecturer: Taught 1 guest class on the topic of forest loss and climate change for a “Global Change” graduate course.
- 2019 ADVANCED CLIMATE DYNAMICS COURSES (ACDC) SUMMER SCHOOL, YOSEMITE, CA
Invited Lecturer: Summer school theme: “The Anthropocene”. *Lectured on land-atmosphere interactions, climate controls on vegetation distributions, vegetation impacts on atmospheric processes, historical vegetation change, projections of future vegetation change, and how vegetation may interact differently with the climate under higher CO₂; discussed vegetation-atmosphere-climate interactions in the field.*
- 2017-2019 UNIVERSITY OF WASHINGTON, SEATTLE, WA
Guest Lecturer: *Advanced Physical Climatology* (graduate); *Ecological Climatology* (undergraduate/graduate); *Exploring the Atmospheric Sciences* (undergraduate)
- 2016 NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, CO
Instructor: *CLM Tutorial - “Modifying the code in CLM” lecture; practical sessions.*
- 2014 UNIVERSITY OF WASHINGTON, SEATTLE, WA
Teaching Assistant: *Global Warming: Understanding the Issues* (undergraduate)
- 2012 UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, BC
Teaching Assistant: *Differential Calculus* (undergraduate)

Grant Reviewer for:

- National Science Foundation (Climate and Large-Scale Dynamics; Hydrologic Sciences) 2019, 2020

Journal Reviewer for:

- Science
Nature
Nature Climate Change
Journal of Climate
Journal of Geophysical Research - Atmospheres

Geoscientific Model Development
Geophysical Research Letters
Journal of Hydrometeorology
Environmental Research Letters
Current Climate Change Reports
Global Planetary Change

Service & Outreach

- 2019 Instructor for the Advanced Climate Dynamics Courses summer school, *Yosemite, CA*
- 2014-2019 Girls in Science outreach program, Burke Museum of Natural History, *Seattle, WA*
- 2017-2019 Mentoring undergraduate & early graduate students in Atmospheric Science, *Seattle, WA*
- 2016-2019 Outreach activities with the UW Department of Atmospheric Sciences, *Seattle, WA*
- 2016-2019 Diversity and Inclusion Group, Department of Atmospheric Sciences, University of Washington, *Seattle, WA*
- 2016-2018 Founding member of the Program on Climate Change Graduate Student Steering Committee, University of Washington, *Seattle, WA*
- 2016 Chair of the 10th Annual Graduate Climate Conference (GCC10) Organizing Committee, *Seattle, WA*
- 2016 Community Land Model (CLM) 2016 Tutorial instructor, *Boulder, CO*
- 2016-2017 University of Washington Program on Climate Change Graduate Student Steering Committee (founding member), *Seattle, WA*
- 2010-2012 Undergraduate Mathematics Volunteer Tutoring, *Vancouver, BC, Canada*
- 2012 East Kootenay Regional Science Fair Judge, *Cranbrook, BC, Canada*

Programming Languages

PYTHON, MATLAB, FORTRAN 90, MAPLE, TCSH

Conferences & Workshops

- 2020 Surface Atmosphere Integrated Field Laboratory (SAIL) Virtual Workshop.
- 2020 Grant Getting, Santa Fe Institute *Virtually / Santa Fe, NM*
- 2020 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2020 Pathways to Scientific Teaching Workshop, University of California, Berkeley *Berkeley, CA*
- 2020 Berkeley Atmospheric Sciences Colloquium (BASC) Symposium, *Berkeley, CA*
- 2019 American Geophysical Union (AGU) Fall Meeting, *San Francisco, CA*
- 2019 Workshop on Entrenchment: "The Point of No Return", Santa Fe Institute, *Santa Fe, NM*
- 2019 "The Anthropocene", Instructor at the Advanced Climate Dynamics Courses (ACDC) Summer School, *Yosemite, CA*
- 2019 Impacts of Land Use and Land Management on Earth System Evolution, Biogeochemical Cycles, Extremes and Inter-Sectoral Dynamics, Aspen Global Change Institute, *Aspen, CO*

- 2019 Postdocs in Complexity Conference VI, Santa Fe Institute, *Santa Fe, NM*
- 2019 24th Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2019 Postdocs in Complexity Conference V, Santa Fe Institute, *Santa Fe, NM*
- 2019 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2018 American Geophysical Union (AGU) Fall Meeting, *Washington, DC*
- 2018 Advanced Climate Dynamics Courses (ACDC) Summer School, *Finse, Norway*
- 2018 23rd Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2018 UW Program on Climate Change Spring Symposium, University of Washington, *Seattle, WA*
- 2018 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2018 National Science Foundation Macrosystems Biology PI Meeting, *Washington, DC*
- 2017 American Geophysical Union (AGU) Fall Meeting, *New Orleans, LA*
- 2017 Stand Up for Science: Graduate Student Advocacy Training (Union of Concerned Scientists Workshop), *Seattle, WA*
- 2017 Ecological Society of America Annual Meeting, *Portland, OR*
- 2017 22nd Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2017 UW Program on Climate Change Spring Symposium, University of Washington, *Seattle, WA*
- 2017 CESM Land Model Working Group Winter Meeting, *Boulder, CO*
- 2017 American Meteorological Society Annual Meeting, *Seattle, WA*
- 2016 10th Annual Graduate Climate Conference, *Pack Forest, WA*
- 2016 21st Community Earth System Model Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2016 Ecosystem Demographics in the Earth System Workshop, National Center for Atmospheric Research, *Boulder, CO*
- 2016 Land Model Working Group Winter Meeting & Joint CESM Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2015 American Geophysical Union (AGU) Fall Meeting, *San Francisco, CA*
- 2015 9th Annual Graduate Climate Conference, *Woods Hole, MA*
- 2015 Aosta Alpine Summer School, Course XXIII: Land-Atmosphere Interactions, Institute of Atmospheric Sciences and Climate (ISAC) – CRN (Turin, Italy) & the Centre national de la recherche scientifique (CNRS) – (France), *Valsavarenche, Aosta Valley, Italy*
- 2015 CESM Land Model Working Group Winter Meeting, National Center for Atmospheric Research, *Boulder, CO*
- 2014 8th Annual Graduate Climate Conference, *Pack Forest, WA*
- 2014 Community Land Model (CLM) Tutorial, National Center for Atmospheric Research, *Boulder, CO*
- 2011 Pacific Institute for the Mathematical Sciences - Applied Mathematics Perspectives Mathematical Biology Workshop, University of Victoria, *Victoria, BC, Canada*