Emma Hudgins

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Education

Establishment: McGill University (September 2016 - present)
Program of Study: PhD in Biology
Current GPA: 4.00
Funding Earned: NSERC Alexander Graham Bell CGS-D ($105,000 over 3yr)
Supervisory Committee: Brian Leung (Supervisor), T. Jonathan Davies, Patrick M. A. James
Project Description: My PhD research aims to build general multispecies models for the various stages of species invasions that are applicable at the pathway level and amenable to risk analytic frameworks. This work aims to elucidate mechanisms that emerge at the macroecological level and that allow for general predictive rules to govern invasions. My work so far has focused on invasive forest pest species in the United States. I have built a general model for all species' dispersal that is highly predictive and suggests that general rules govern the spread of all pest species at broad scales. I am also interested in building detection and establishment models to create a general framework for invasions at the macroecological scale that can be applied in a surveillance setting.

Establishment: McGill University (September 2015 – August 2016)
Program of Study: MSc in Biology
GPA: 4.00
Funding Earned: NSERC Alexander Graham Bell CGS-M ($17,500 over 1yr)
Supervisory Committee: Brian Leung (Supervisor), T. Jonathan Davies, Patrick M. A. James
Project Description: Same as above (Fast-tracked to PhD after 1yr)

Establishment: McGill University (August 2011- May 2015)
Program of Study: Bachelor of Science, Biological, Biomedical and Life Sciences: Honours Biology, Minor Environment
Graduating CGPA: 3.97 (First Class Honours, Dean's Honour List)

Teaching

Course: BIOL 373 - Biometry (Fall 2015, 2016, 2017, 2018)
Institution: McGill University
Description: An accelerated biostatistics course intended for students pursuing undergraduate research. Includes lectures on statistical theory and computer labs focusing on the R programming language.
Roles: Led laboratory sessions, held office hours, graded assignments, lab reports, exams, attended to online discussion boards, designed exam questions. Guest lectured once per term.

Course: ENVR 202 – The Evolving Earth (Winter 2015, 2016)
Institution: McGill University
Description: An introductory environmental science course spanning themes of

ecology and evolution, geography, geology, and atmospheric science in lecture format.
Roles: Graded exams, assignments and papers, held office hours, led tutorial lectures, attended to the online discussion board.

Volunteer/ Research Experience

McGill Biology Graduate Students Association (Sept 2017-Current)
Position: Equity and Diversity Commissioner
Responsibilities: As Equity and Diversity Commissioner, I ensure that all BGSA events run in an anti-oppressive fashion and ensure that all students feel safe and free from isolation on campus. I organize equity workshops and act as a point of contact for student support.

Dr. Brian Leung Lab, McGill (September 2014-May 2015)
Position: Honours Researcher
Responsibilities: I worked on an Honours project focusing on the creation of a modified regression model technique for invasive forest pest spread across the United States validated through theoretical simulations.

Canadian Rivers Institute (CRI), University of New Brunswick (May 2012 – September 2015)
Position: Summer Student (3 NSERC USRAs)
Responsibilities: I aided graduate students in their various applied freshwater ecology projects. This included creating GIS maps of fish species distributions by creating a database of catch records, assessing the effect of a hydroelectric dam on salmon passage at various life stages, measured the bathymetry and abiotic conditions of a river downstream of a dam, assessing the potential for a commercial Brown Bullhead fishery in the province of New Brunswick, developing a preliminary lake classification system for New Brunswick based on community assessments of representative lakes in the province, confirming the presence of a rare fish (Redbreast Sunfish) in the province, and assessing the effectiveness of stocking Atlantic salmon fry in one river.

Dr. Anthony Ricciardi Lab, Redpath Museum, McGill (January 2014-May 2014)
Responsibilities: I worked on an independent research project studying the behaviour of *Gammarus pulex,* an invasive amphipod species in Ireland, in response to brown trout chemical cues. I worked under the supervision of a PhD student (Josephine Iacarella) in Dr. Ricciardi's lab. I collected over 60 hours of behavioural data while coding the amphipod behaviour in JWatcher, and built general linear models in R for statistical analysis. Josephine and I are in the process of submitting the revisions of the paper we produced from this project to the Canadian Journal of Fisheries and Aquatic Sciences.

Dr. David Green Lab, Redpath Museum, McGill (January 2013-May 2013)
Responsibilities: I measured American and Fowler's toads using calipers and mined morphological data from online museum databases for a PhD student's (David O'Connor) phylogeography project.

Santropol Roulant (September 2012 – June 2016)
Responsibilities: I ran McGill's branch of the largest Meals-On-Wheels in Montreal. Santropol Roulant produces meals locally and sustainably for those living with a loss of autonomy. I coordinated all McGill volunteers and fundraising

for the organization. I also helped with cooking and delivering of the meals. I also worked in their community garden that grows the food used to produce the meals.

The McGill Biology Student Union (September 2013-May 2014)
Responsibilities: I acted as VP Sustainability on the MBSU's executive. I organized all fundraising for the organization, and ensured all of our events ran sustainably, which included composting initiatives and the use of reusable dishware at all of our events. I was also the undergraduate representative for the Biology Department's Green Committee.

Skills

Quantitative: I have a very strong base in the R programming language and bash scripting. I am comfortable with MS Excel, GIS, and MATLAB. I also have working knowledge of C and C++. I achieved the highest mark in my undergraduate biostatistics class, indicating a strong proficiency in statistics and quantitative methods. I use modern applied statistical tools every day, including GLMM, GAM and other SDM methods, Bayesian methods, simulation modelling, Latin Hypercube sampling, and numerical optimization. I deploy many of my algorithms in a parallel-processing framework.

Field: I took two field ecology courses during my undergrad, one in tropical ecology in Barbados, and another in Limnology at Mont-Ste-Hilaire, QC. I am familiar with a number of limnological and fisheries sampling techniques, and have 4 years of limnological/fisheries field experience.

Language: I speak both English and French, and achieved a result of Advanced Plus on New Brunswick's French oral proficiency assessment.

Publications

Hudgins, E.J., Liebhold, A.M., & Leung, B. Comparing generalized to customized models for United States invasive forest pests. *In prep. Ecology.*

Leung, B., **Hudgins, E. J.**, Potapova, Anna, & Ruiz-Jaen, Maria. A new baseline for countrywide α-diversity and species distributions: illustration using >6000 plant species in Panama. *In review. Ecological Applications.*

Hudgins, E.J., Liebhold, A.M., & Leung, B. Corrigendum: Predicting the spread of all invasive forest pests in the United States. *In press. Ecology Letters.*

Hudgins, E.J., Liebhold, A.M., & Leung, B. Predicting the spread of all invasive forest pests in the United States. *Ecology Letters (2017) 20(4): 426-435.*

Iacarella, J.C., **Hudgins, E.J.**, Dick, J.T.A., & Ricciardi, A. Predatory behaviour of an invasive amphipod in response to the presence of conspecifics and predation risk. *Canadian Journal of Fisheries and Aquatic Sciences (2017) 75(1): 131-140*

Hudgins, J., **Hudgins, E.J.,** Ali, K., & Mancini, A. Citizen science surveys elucidate key foraging and nesting habitat for two endangered marine turtle species within the Republic of Maldives. *Herpetology Notes 10: 463-471.*

Presentations

Hudgins, E.J.*, Liebhold, A. M., & Leung B. *Comparing generalized to customized models for United States invasive forest pests.* Presented at the Ecological Society of America Annual Meeting, August 8th, 2018 (Regional Conference - Graduate work).

Hudgins, E.J.*, Liebhold, A. M., & Leung B. *Comparing generalized to customized models for United States invasive forest pests.* Presented at the Quebec Centre for Biodiversity Science Symposium, December 15th, 2017 (Regional Conference - Graduate work).

Hudgins, E.J.*, & Leung B. *The effect of host diversity on the establishment of United States invasive forest pests.* Presented at the McGill Conservation, Ecology, Evolution and Behaviour retreat, April 8th, 2017 (Departmental Conference - Graduate work).

Hudgins, E.J.*, Liebhold, A. M., & Leung B. *Forecasting United States forest invaders: A general predictive model for pest spread.* Presented at the Quebec Centre for Biodiversity Science Symposium, December 16th, 2016 (Regional Conference - Graduate work).

Hudgins, E.J.*, Liebhold, A. M., & Leung B. *Forecasting United States forest invaders: A general predictive model for pest spread.* Presented at the Ecological Society of America Annual Meeting, August 11th, 2016 (International Conference - Graduate work).

Hudgins, E.J.* *Modelling invasive forest pest spread across the United States.* Presented at the Centre for Applied Mathematics in Biology of Medicine End-Of-Year Symposium. April 28th, 2015. (Provincial working group – Honours work).

Hudgins, E.J.* *Modelling invasive forest pest spread across the United States.* Presented at McGill's Honours Symposium, April 15th, 2015. (McGill Undergraduate Symposium – Honours work).

Iacarella, J.C.*, **Hudgins, E.J.**, Dick, J.T.A. & Ricciardi, A. *Predatory behavior of an invasive amphipod (Gammarus pulex) in the presence of fish cues and conspecifics.* Paper presented at the Canadian Aquatic Invasive Species Network Annual General Meeting, Gatineau, Ontario. April 2014. (National Conference – Independent Study Project work).

*** indicates presenting author**

Workshops/ Training/ Journal Clubs

Name: McGill Conservation, Ecology, Evolution, and Behaviour Discussion Group
Location: McGill University
Description: A weekly journal club where faculty and graduate students meet to discuss recent papers in allied fields.

Name: McGill Organismal Seminar Series
Location: McGill University
Description: A weekly departmental seminar series for organismal biology researchers where visiting researchers give presentations.

Name: Joint NIMBioS-MBI-CAMBAM Summer School (Summer 2017)

Location: University of Tennessee, Knoxville
Description: A quantitative biology/epidemiology workshop focusing on fitting models to biological data. Topics covered included state space models, parameter estimation, identifiability analyses, game theory, network theory.

Name: Statistics and Biology Exchange Group (S-BEX) (Winter 2015-Winter 2017
Location: McGill University/ Université de Montréal
Description: A weekly discussion group where biologists, epidemiologists and statisticians work collaboratively to solve one another's research problems.

Name: Quebec Centre for Biodiversity Science Data Visualization Workshop (Spring 2016)
Location: Gault Nature Reserve, McGill University
Description: A weekend workshop on data visualization. Topics covered included working in Inkscape, R plotting packages, heuristics for strong visualizations.

Name: Quebec Centre for Biodiversity Science Intensive Course (Fall 2015)
Location: Gault Nature Reserve, McGill University
Description: A two-week graduate course covering recent advanced topics across fields of biodiversity science. Topics covered included species distribution models, phylogenetic analyses, taxonomic identification, valuation of ecosystem services, collaboration with indigenous peoples.

Name: QCBS Geostatistics Workshop (Fall 2015)
Location: Quebec Centre for Biodiversity Science, McGill University
Description: An introductory workshop covering geostatistical methods. Topics covered included kriging, raster work in R, variograms and semivariograms.

Certifications and Licensures

PADI Open Water Diver
Swiftwater Safety Rescue Technician Level 2
Backpack Electrofishing Certificate
Advanced Wilderness First Aid Certificate
McGill Lab Safety Course (WHMIS)
Pleasure Craft Operator's Card
Cardiopulmonary Resuscitation (CPR) Certificate
Workplace Standard First Aid Certificate
Automatic External Defibrillator (AED) certificate
National Lifeguard Service (NLS) Certificate- *expired*
CPR Instructor Certificate- *expired*
Lifesaving Instructor Certificate (LSI) - *expired*

Honours

NSERC Michael Smith Foreign Study Supplement (McGill 2018)
NSERC Alexander Graham Bell CGS-D (McGill 2017)
Quebec Centre for Biodiversity Science Excellence Award (McGill 2016)
Lorne Trottier Accelerator Award (McGill 2016)
Arthur Willey Memorial Fellowship (McGill 2015)
NSERC Alexander Graham Bell CGS-M (NSERC 2015)
McGill Graduate Excellence Award (McGill 2015)
Frank Rigler Prize in Ecology (McGill 2015)
McGill Deans Honours List (McGill ’13, ’14, ’15)
Tomlinson Undergraduate Teaching Award (McGill 2014)
Richard Adams Award (McGill 2014)
Jurate Tanner Scholarship in Science (McGill 2014)
McGill Biology Student Union Field Study Bursary (MBSU 2014)
NSERC Undergraduate Research Award (’12), (’13), (’14)
Emily Ross Crawford Scholarship (McGill 2013)