Emma J. Hudgins, PhD

Department of Biology, Carleton University
1-514-245-2054
emma.hudgins@carleton.ca
Twitter/Github:@emmajhudgins
ejhudgins.com

Current Appointment

Establishment: Carleton University (September 2020)
Position: Postdoctoral Fellow
Funding Earned: FRQNT B3X ($90,000)
Principal Investigator: Prof. Joseph Bennett
Project Description: My goal is to produce general rules of thumb for the best invasive pest management strategies, and for the budgetary balance between management and surveillance. I will use these rules of thumb to create an open-source tool for Canadian forests in collaboration with other lab members and Canadian government agencies, including Natural Resources Canada- Canadian Forest Service (NRCan-CFS), and the Canadian Food Inspection Agency (CFIA).

Education

Establishment: McGill University (September 2016 – September 2020)
Program of Study: PhD in Biology
GPA: 4.00
Funding Earned: NSERC Alexander Graham Bell CGS-D ($105,000)
Supervisory Committee: Brian Leung (Supervisor), T. Jonathan Davies, Patrick M. A. James
Project Description: I aimed to build general multispecies models for the various stages of species invasions that are applicable at the large scales. My research has focused on both a more descriptive understanding the initial establishment and dispersal phases of invasions and delineating the impacts caused by species across space and time, to more prescriptive analyses of optimal management practices to control invasive spread and limit economic losses. I am interested in uncovering broad generalities that emerge across species in spite of their idiosyncrasies, as a consequence of anthropogenic processes. My current study system is invasive forest pests, where human transport (via firewood and analogous mechanisms) is the main source of these largescale generalities.

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)
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

Independent Study Supervisor - ENSC 4901 – Directed Studies (Fall 2020, Winter 2021) **-** Carleton University

Mentor - BIOL 5512 – Advances in Applied Ecology (Fall 2020) **-** Carleton University

TA - BIOL 373 - Biometry (Fall 2015, 2016, 2017, 2018, 2019) **-** McGill University

TA - ENVR 202 – The Evolving Earth (Winter 2015, 2016, 2017, 2019) - McGill University

Undergraduate TA - BIOL 308 – Ecological Dynamics - McGill University (Winter 2015)

Academic Employment

Dr. Eve McDonald-Madden Lab, University of Queensland (February 2018-May 2018)- Visiting Scholar

Dr. Brian Leung Lab, McGill (September 2014-May 2015)- Honours Researcher

Canadian Rivers Institute (CRI), University of New Brunswick (May 2012 – September 2015)- Summer Student (3 NSERC USRAs)

Dr. Anthony Ricciardi Lab, Redpath Museum, McGill (January 2014-May 2014)- Independent study student

Dr. David Green Lab, Redpath Museum, McGill (January 2013-May 2013)- wet lab volunteer

Other Employment

Tierra Co. (February 2020-Current) - Independent Statistical Consultant

Service

Carleton Biology Department Board (Sept 2020-Current)- Alternate postdoc representative

McGill Biology Graduate Students Association (Sept 2019-Sept 2020)- Social Media Representative

Faculty of Science Committee on Equity and Climate, McGill University (September 2019-Current)- Graduate student representative

Postgraduate Students Society of McGill University Equity Committee (September 2017 – May 2020)- Biology Graduate Student Representative

Biology Department Day and Equity Workshop (3 events from 2017-2019)- Co-organizer

STEMM Diversity @ McGill (September 2017-November 2017)0 Volunteer

Equity in STEMM Working Group (January 2016-September 2019) Co-founder

McGill Biology Graduate Students Association (Sept 2017-August 2019) -

Equity and Diversity Representative

Skills

Programming Languages: R (excellent), Python (very good), bash/shell (very good), CSS (good), Markdown (good), C/C++ (basic).

Software: QGIS, ArcGIS, SAS, MATLAB, GitHub

Quantitative methods: Routine use of GLMM, GAM, Boosted Regression Trees, Bayesian methods, simulation modelling, Latin Hypercube sampling, Nelder-Mead methods, genetic algorithms, neural networks, mixed-integer linear programming (MILP). I deploy many of my algorithms in a parallel-processing framework.

Field Techniques: Tropical ecology field course in Barbados, Limnology field course at Mont-Ste-Hilaire, QC, 4 years of limnological/fisheries field experience.

Languages: English (native) and French (conversational)

Publications

Hudgins, E.J., Davies, T. J., & Leung, B. A unifying phylogenetic model of amplification and dilution effects of host biodiversity on pest establishment. *In prep.*

Helmus, M .R., De Bona, S., & **Hudgins, E. J.** Risk of cashing out the global invasion credit: An emerging agricultural pest in the U.S. heralds a new era of invasive species impacts. *In prep.*

Hudgins, E. J., Koch, F. H., Ambrose, M. J., & Leung, B. Estimating damage to urban trees from US invasive forest pests. *In prep.*

Ahmed, D. Hudgins, E.J., Cuthbert, R., Haubrock, P. J., Renault, D., Bonnaud, E., Diagne, C., & Courchamp, F. Modelling the damage costs of invasive alien species. *In review. Biological Invasions.*

Crystal-Ornelas, R., **Hudgins, E.J.,** Cuthbert, R. N., Haubrock, P. J., Fantle-Lepczyk, J., Angulo, E., Kramer, A., Ballesteros-Mejia, L., Leroy, B., Leung, B., López-López, E., Diagne, C., & Courchamp, F. Economic costs of biological invasions within North America. *In press. Neobiota.*

Hudgins, E.J., Liebhold, A.M., & Leung, B. Comparing generalized to customized models for United States invasive forest pests*. Ecological Applications (2020) 30 (1), e01988.*

Leung, B., **Hudgins, E. J.**, Potapova, A., & Ruiz-Jaen, M. (2019). A new baseline for countrywide α-diversity and species distributions: illustration using >6000 plant species in Panama. *Ecological Applications (2019) 29(3): e01866.*

Hudgins, E.J., Liebhold, A.M., & Leung, B. Corrigendum: Predicting the spread of all invasive forest pests in the United States. *Ecology Letters (2018) 21(11): 1752-1754.*

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 (2017) 10: 463-471.*

Oral Presentations

Hudgins, E.J.*, Koch, F. H., Ambrose, M. J., & Leung, B., *Estimating the economic damages of United States invasive forest pests.* Presented at the World Conference on Natural Resource Modelling, May 23rd, 2019 (International Conference – Graduate work). Winner – Best Student Presentation.

Hudgins, J.A.*, & **Hudgins, E.J.,** *How to get meaningful results from opportunistic photo-ID data*. Presented at the International Sea Turtle Symposium, February 2nd, 2019. (International Conference - Side project).

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 12th, 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 Ecological Society of America Annual Meeting, August 8th, 2018. (International Conference - Graduate work).

Hudgins, E.J.*. Optimal control of the spread of invasive forest pests in the United States. Presented at the Mathematics of Biological Systems Management conference, University of Melbourne, April 6th, 2018. (International conference – Graduate work)

Hudgins, E.J.*. Optimal control of the spread of invasive forest pests in the United States. Presented at the University of Queensland's Centre for Biology and Conservation Science's weekly seminar series, March 20th, 2018. (International invited seminar – Graduate work)

Hudgins, J.A.*, **Hudgins, E.J.,** *Determining abundance, apparent survival, and temporary emigration for hawksbill turtles using opportunistic photo-ID data in the Republic of Maldives*. Presented at the International Sea Turtle Symposium, February 18th, 2018. (International Conference - Side project).

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.*, Liebhold, A. M., & Leung B. *Comparing generalized to customized models for United States invasive forest pests.* Presented at the Ecology and Evolution Lunches series, Nov 23rd , 2017. (Departmental invited seminar - 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**

Poster presentations

Hudgins, E.J.*, Davies, T.J., Leung, B. *A unifying phylogenetic model for the effect of host phylogenetic diversity on invasive pest establishment.* Poster presented at the British Ecological Society Festival of Ecology. Dec 14-18th, 2020. (International Conference – Graduate work).

Hudgins, E.J.*, Koch, F. H., Ambrose, M. J., Leung, B., *Estimating the economic damages of United States invasive forest pests.* Poster presented at Natural Resouces Canada's Forest Pest Management Forum, December 3-5th, 2019 (National Conference – Graduate work).

*** indicates presenting author**

Other publications

Hudgins, E. J. *Networking with gators: My trip to Fort Lauderdale.* January 26, 2018. Quebec Centre of Biodiversity Science Blog "Le Beagle", https://lebeagle.qcbs.ca.

Workshops/ Training/ Journal Clubs

Carleton Geomatics and Landscape Ecology Laboratory Friday Discussion Group (Sept 2020-)
InvaCost Workshop (November 12-15, 2019)
QCBS R Markdown Workshop (March 5, 2019)
McGill Conservation, Ecology, Evolution, and Behaviour Discussion Group (September 2017- September 2019)
McGill Organismal Seminar Series (September 2015-September 2020)
MARXAN Decision Support Tool Workshop (March 7-8, 2018)
Gender Summit North America 2017

Statistics and Biology Exchange Group (S-BEX) (Winter 2015-Winter 2017
Joint NIMBioS-MBI-CAMBAM Summer School (Summer 2017)
IGSF Feminist Pedagogy Workshop (October 2016)
Quebec Centre for Biodiversity Science Data Visualization Workshop (Spring 2016)
Quebec Centre for Biodiversity Science Intensive Course (Fall 2015)
QCBS Geostatistics Workshop (Fall 2015)

Reviewer for:
Applied Vegetation Science
Biological Invasions
Diversity and Distributions
Ecology Letters
Forests
Journal of Applied Ecology
Journal of Biogeography
Journal of Ecology
Management of Biological Invasions
Nature Conservation
Royal Society Open Science

Editorial Duties:
Frontiers in Insect Science – Invasive Insect Species (Review Editor)

Certifications and Licensures

PADI Open Water Diver
Swiftwater Safety Rescue Technician Level 2
McGill Lab Safety Course (WHMIS)
Pleasure Craft Operator's Card
Backpack Electrofishing Certificate

Honours

FRQNT B3X Postdoctoral Scholarship (2020) – *$90,000*
Best Student Presentation Prize – World Conference on Natural Resource Modelling (2019) - *$500 USD*
McGill Graduate Mobility Award (McGill 2018) - *$858*
NSERC Michael Smith Foreign Study Supplement (McGill 2018) - *$6,000 CAD*
NSERC Alexander Graham Bell CGS-D (McGill 2017) - $105,000 CAD
Quebec Centre for Biodiversity Science Excellence Award (QCBS 2016, 2018) - *$755, $988 CAD*
McGill Biology GREAT Travel Award - *$500 CAD*
Quebec Centre for Biodiversity Science Intensive Course Award (QCBS 2015) -

$1297 CAD
Lorne Trottier Accelerator Award (McGill 2015) - *$10,000 CAD*
Arthur Willey Memorial Fellowship (McGill 2015) - *$2,500 CAD*
NSERC Alexander Graham Bell CGS-M (NSERC 2015) - *$17,500 CAD*
McGill Graduate Excellence Award (McGill 2015) - *$2,500 CAD*
Frank Rigler Prize in Ecology (McGill 2015) - *$980 CAD*