

# JACOB WITTMAN

I am a quantitative invasion entomologist specializing in experimental design, statistical inference, communication, and teaching. I am seeking a data scientist role which makes use of my experience managing complex ecological projects, collaborating across disciplines with varied stakeholders, and connecting my analysis to practical management outcomes. References are available upon request.

## 💻 PROJECTS

Current  
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2019

- **Evaluating anisotropy in the spread of emerald ash borer**  
University of Minnesota 📍 Saint Paul, MN

- Modeled the spread of emerald ash boerer across North America using generalized additive models and simultaneous autoregressive models.
  - Model predictions will be used by managers in North America to assess when emerald ash borer will spread to their communities and plan management tactics accordingly.

2021  
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2018

- **Estimating the range of attraction of a sex-pheromone used in traps to detect emerald ash borer**  
University of Minnesota 📍 Saint Paul, MN

- Applied a novel trapping arrangement in conjunction with a non-linear Bayesian regression to elucidate the range of attraction of a sex-pheromone used to trap emerald ash borer.
  - Demonstrated that the sex-pheromone is attractive at a range of 90 feet.
  - Communicated results to managers internationally to develop efficient early-detection trap networks.

2020  
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2018

- **Forecasting overwintering mortality of a biological control agent in North America**  
University of Minnesota 📍 Saint Paul, MN

- Assessed the cold tolerance of a parasitic wasp used to control populations of emerald ash borer via laboratory and field experiments.
  - Forecast overwintering survival of this parasitic wasp across the USA and Canada using generalized estimating equations.

2018  
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2016

- **Determining the efficacy of regulatory requirements on limiting the spread of *Lymantria dispar***  
University of Minnesota 📍 Saint Paul, MN

- Evaluated the efficacy of regulatory requirements in lumber yards designed to reduce the spread of the invasive moth *Lymantria dispar* through careful experimentation.
  - Demonstrated that current regulatory requirements were likely sufficient to reduce inadvertent movement of this insect.
  - Supported decisions with results from generalized linear regressions and Monte Carlo simulations.

## CONTACT

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- ✉️ [wittja01@gmail.com](mailto:wittja01@gmail.com)
- 🔗 [github.com/wittja01](https://github.com/wittja01)
- 🔗 [linkedin.com/in/wittja01](https://linkedin.com/in/wittja01)
- 🔗 [wittja01.github.io/website](https://wittja01.github.io/website)
- 🐦 [wittja01](https://twitter.com/wittja01)

## SKILLS

Supervised and unsupervised machine learning

Experimental design and inference

Bayesian and Frequentist statistical methods

Communicating technical material to non-technical audiences

R and R Studio

Data Visualization (R and Shiny)

git & GitHub

HPC with R

Relational Databases

Basic Python and SQL

Made with the R packages [pagedown](#) and [datadrivencv](#).

Last updated on 2021-11-30.

## EDUCATION

Current  
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2018

- **PhD., Entomology (graduate minor Biostatistics)**  
University of Minnesota  Saint Paul, MN
  - Dissertation: Addressing outstanding questions related to the management of emerald ash borer *Agrilus planipennis* (Coleoptera: Buprestidae)
  - Developed models intended to support invasive species managers in deciding when and where to target detection efforts and releases of biological control agents to manage the invasive beetle emerald ash borer.
  - Relevant coursework: Biostatistical Inference, Statistical Methods for Correlated Data, Biostatistical Modeling and Methods, Statistical Learning and Data Mining, Data Management for Biologists, Introduction to Bayesian Analysis, Spatial Biostatistics

2018  
|  
2016

- **M.S., Entomology**  
University of Minnesota  Saint Paul, MN
  - Thesis: Effects of host type and food deprivation on the movement behavior of late-instar larvae of gypsy moth *Lymantria dispar* (Lepidoptera: Erebidae)
  - Designed and analyzed experiments intended to evaluate and improve current regulatory practices targeting the invasive caterpillar *Lymantria dispar*.
  - Relevant coursework: R for Natural Resource Sciences, Advanced R Programming, Statistics for Ecologists, Spatial and Temporal Analyses

2012  
|  
2008

- **B.S., Biology, Environmental Studies (minor Secondary Education)**  
Luther College  Decorah, IA

## PUBLICATIONS

2021

- **Forecasting overwintering mortality of *Spathius galinae* in North America**  
*Biological Control* 160: 104694  
J. Wittman, B. Aukema, J. Duan, and R. Venette

2021

- **Optimizing early detection strategies: defining the effective attraction radius of attractants for emerald ash borer *Agrilus planipennis* Fairmaire**  
*Agricultural and Forest Entomology* 23(4): 527 – 535.  
J. Wittman, P. Silk, K. Parker, and B. Aukema

2020

- **A guide and toolbox to replicability and open science in entomology.**  
*Journal of Insect Science* 20(3): 1 – 9.  
J. Wittman and B. Aukema

2020

- **Rail transport as a vector of emerald ash borer**  
*Agricultural and Forest Entomology* 22(1): 92 – 97.  
M. Short, K. Chase, T. Feely, A. Kees, J. Wittman, and B. Aukema

- 2020 • Factors associated with diversity and distribution of buprestid prey captured by foraging *Cerceris fumipennis* (Hymenoptera: Crabronidae)  
*Environmental Entomology* 49(6): 1363 - 1373.  
M. Hallinen, J. Wittman, and B. Aukema
- 2019 • Foliage type and deprivation alters the movement behavior of late instar European gypsy moth *Lymantria dispar* (Lepidoptera: Erebidae)  
*Journal of Insect Behavior* 32(1): 25 – 37.  
J. Wittman and B. Aukema
- 2019 • A comparison of adult butterfly communities on remnant and planted prairies in northeast Iowa  
*Journal of the Lepidopterists' Society* 73(4).  
E. Stivers, J. Wittman, and K. Larsen
- 2019 • Characterizing and simulating the movement of late-instar gypsy moth (Lepidoptera: Erebidae) to evaluate the effectiveness of regulatory practices  
*Environmental Entomology* 48(3): 496 - 606.  
J. Wittman, R. Nicoll, S. Myers, P. Chaloux, and B. Aukema
- 2017 • Butterfly surveys are impacted by time of day  
*Journal of the Lepidopterists' Society* 71(2): 125 – 129.  
J. Wittman, E. Stivers, and K. Larsen
- 2013 • Evaluation of land use and water quality in an agricultural watershed in the USA indicates multiple sources of bacterial impairment  
*Environmental Monitoring and Assessment* 185(12): 10395 – 10420.  
J. Wittman, A. Weckwerth, C. Weiss, S. Heyer, J. Seibert, B. Kuennen, C. Ingels, L. Seigley, K. Larsen, J. Enos-Berlage

## INVITED PRESENTATIONS

- 2019 • What You Eat Affects How You Move: Links Between Caterpillar Behavior and Gypsy Moth Management.  
Annual Gypsy Moth Review  
• J. Wittman, R. Nicoll, S. Myers, P. Chaloux, and B. Aukema  
• Seattle, WA, USA
- 2016 • Evaluating the effectiveness of buffer zone practices in preventing the spread of gypsy moth (*Lymantria dispar*)  
Gypsy Moth Program Advisory Committee Meeting  
• J. Wittman, P. Chaloux, D. Lance, and B. Aukema  
• Saint Paul, MN, USA
- 2016 • I Would Walk 500 Miles: Orientation and Movement Potential of Gypsy Moth Larvae in a Simulated Lumber Yard  
Annual Gypsy Moth Review  
• J. Wittman, P. Chaloux, D. Lance, and B. Aukema  
• Cleveland, OH, USA

## CONTRIBUTED PRESENTATIONS

- 2021 • **Forecasting overwintering mortality of *Spathius galinae* in North America**  
North American Forest Insect Working Conference  
• J. Wittman, B. Aukema, J. Duan, and R. Venette  
• Virtual
- 2020 • **Cold tolerance and overwintering mortality of *Spathius galinae* in Minnesota**  
Upper Midwest Invasive Species Conference  
• J. Wittman, R. Venette, J. Duan, and B. Aukema  
• Virtual
- 2020 • **Estimating the effective attraction radius of a short-range sex pheromone of emerald ash borer (*Agrilus planipennis*) in baited traps**  
Entomological Society of America National Meeting  
• J. Wittman, K. Parker, P. Silk, and B. Aukema  
• Virtual
- 2019 • **Using Bayesian statistical methods to estimate the effective attraction radius of a short-range sex pheromone of emerald ash borer in baited traps**  
Entomological Society of America National Meeting  
• J. Wittman, K. Parker, K. Ryall, P. Silk, and B. Aukema  
• St. Louis, MO, USA
- 2019 • **Replicability and open science in entomology**  
Department of Entomology Seminar, University of Minnesota  
• J. Wittman  
• Saint Paul, MN, USA
- 2019 • **Effect of cooling rate on survival of *Spathius galinae* when exposed to sub-zero temperatures**  
North Central Forest Pest Workshop  
• J. Wittman, J. Duan, R. Venette, and B. Aukema  
• Lisle, IL
- 2018 • **Effects of host foliage on the movement behavior of larvae of gypsy moth (*Lymantria dispar*)**  
Entomological Society of America National Meeting  
• J. Wittman, P. Chaloux, S. Myers, and B. Aukema  
• Vancouver, BC, Canada
- 2018 • **Keeping gypsy moth where they are: Investigating how far gypsy moth larvae can move**  
Western Forest Insect Work Conference  
• J. Wittman, P. Chaloux, S. Myers, and B. Aukema  
• Denver, CO, USA

2017

- Evaluating gypsy moth (*Lymantria dispar*) larval movement potential and effective barriers limiting their movement

Entomological Society of America National Meeting

- J. Wittman, S. Myers, P. Chaloux, and B. Aukema
- Denver, CO, USA

2017

- Supporting policy with science: Are buffer zones around wood products effective at preventing the spread of gypsy moth (*Lymantria dispar*)

International Union of Forest Research Organizations - Forest Insects and Pathogens in a Changing Environment

- J. Wittman, S. Myers, P. Chaloux, and B. Aukema
- Thessaloniki, Greece

2016

- Do buffer zones prevent the spread of gypsy moth (*Lymantria dispar*)

Upper Midwest Invasive Species Conference

- R. Nicoll, J. Wittman, S. Myers, D. Lance, and B. Aukema
- La Crosse, WI, USA

2016

- Bees, butterflies, and beetles: a comparison of remnant and planted prairies in Northeast Iowa

Day of Insects - Iowa State University

- J. Wittman, E. Stivers, and K. Larsen
- Ames, IA, USA



## POSTER PRESENTATIONS

2019

- Prey diversity of foraging *Cerceris fumipennis* Say (Hymenoptera: Crabronidae) and factors influencing buprestid diversity and species distributions in Minnesota

Entomological Society of America National Meeting

- M. Hallinen, J. Wittman, and B. Aukema
- St. Louis, MO, USA

2018

- Developing science to support practice: Determining distances required to protect log decks from wandering gypsy moth larvae

United States Department of Agriculture Interagency Forum on Invasive Species

- J. Wittman, P. Chaloux, S. Myers, and B. Aukema
- Annapolis, MD, USA

2015

- A comparison of adult butterfly communities on remnant and planted prairies in northeast Iowa

Entomological Society of America National Meeting

- E. Stivers, J. Wittman, and K. Larsen
- Minneapolis, MN, USA

2012

- **Exploring the Dry Run Creek watershed: molecules, microbes, and macroinvertebrates**  
Iowa Water Conference
  - J. Wittrman, A. Weckwerth, J. Enos- Berlage
  - Ames, IA, USA



## TEACHING EXPERIENCE

Current  
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2019

- **Private R and Statistics Tutor**  
Online   
Wyzant Tutoring
  - Provide individualized R and/or statistics tutoring sessions to students ranging from high school to graduate school.

2021  
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2019

- **Guest Lecturer**  
Various Locations
  - R Programming for Technology Applications (DIGA 645A), Saint Mary's University of Minnesota
  - Forest Entomology (ENT 4251), University of Minnesota

2020  
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2019

- **Certificate: Preparing Future Faculty**  
University of Minnesota   
Saint Paul, MN
  - Completed a certificate program provided by the University of Minnesota to graduate students to prepare them for teaching in higher education.
  - Used best practices in pedagogy to design instructional activities for a graduate level statistics course in which I guest taught.

2020

- **Spatial and Temporal Analyses (ENT 5126)**  
University of Minnesota   
Saint Paul, MN
  - Developed and delivered lectures on linear regression to graduate students. Assessed learning with brief formative and summative assessments. Assisted students with lab activities including writing R code and interpreting statistical analyses.
  - Course covered appropriate ways to analyse data with temporal or spatial structure in R.

2018

- **Insect Biology (ENT 1005)**  
University of Minnesota   
Saint Paul, MN
  - Led one lab section of undergraduate students. Delivered lectures on topics in insect biology. Co-developed lab activities and assessments to meet course learning objectives.

2016  
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2014

- **Science Teacher (7 - 12 grade)**  
DREAM Technical Academy   
Willmar, MN
  - Developed project-based learning curriculum. Helped align student projects and interests with state learning targets and outcomes.
  - Participated in faculty-led administrative structure. Served as chair of Technology Committee (2014 - 2016). Served on Personnel Committee (2014) and Facilities Committee (2015).
  - Held position as 'Convener Teacher' in 2015 - 2016 school year where I led all-staff meetings, attended district and state level meetings, and monitored and reported on school progress toward state goals.

Being a teacher made me a better communicator. I learned effective strategies for delivering technical material to non-technical audiences. Working with diverse groups of students over my teaching career helped me understand the importance of empathy to build constructive learning communities.

## GRANTS, HONORS, AND AWARDS

2021  
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2020

### ● Doctoral Dissertation Fellowship (\$25000)

University of Minnesota

📍 Saint Paul, MN

- Competitive university wide fellowship awarded to students in the final year of their doctoral program.

2020

### ● Marion Brooks Wallace Award (\$2000)

Department of Entomology, University of Minnesota

📍 Saint Paul, MN

- Competitive award for a PhD student conducting basic research in entomology.

2020

### ● President's Prize (\$100)

Entomological Society of America

- Award for placing first in the graduate student presentation competition.

2019

### ● Council of Graduate Student Travel Grants (\$205)

Council of Graduate Students, University of Minnesota

📍 Saint Paul, MN

- Competitive travel grant available to graduate students at the University of Minnesota.

2017  
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2016

### ● McLaughlin Gormley King Fellowship (\$20000)

Department of Entomology, University of Minnesota

📍 Saint Paul, MN

- Competitive department fellowship to support outstanding students carrying out research in the area of integrated pest management.

2013  
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2012

### ● Howard Hughes Medical Institute Teacher Scientist Fellowship

Luther College

📍 Decorah, IA

- Competitive fellowship to fund a fifth year of post-undergraduate education to complete coursework and practicum experience required for a teaching license.