

# S. J. Frankenberg

## Curriculum Vitae

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### EDUCATION

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- Expected May 2020 M.S. in Biology, *University of Dayton, Ohio*  
• Research Assistantship: Fire & Larch Arctic Regeneration Experiment
- August 2011- May 2015 B.S. in Biology, 3.57 GPA, *University of Dayton, Ohio*  
2010- 2011 Coursework contributing to B.S., *Ohio State Academy, Ohio*  
• Study Abroad: Global Environmental Health- Costa Rica

### CERTIFICATES

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- 2018 Wilderness First Aid (WFA), with focus on Arctic environments  
2015 Geographic Information Systems, Graduate Certificate, *University of Dayton*

### AWARDS

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- May 2015 John J. Comer Ecological Undergraduate Research Award, *University of Dayton*

### AWARDED GRANTS

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- May 2019 Graduate Student Summer Fellowship, \$5,350, *University of Dayton*,  
Title: Fire, Ice, fungi, forest: exploring the mesh of relationships that drive seedling recruitment in the Siberian Arctic

### RESEARCH EXPERIENCE

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*Master of Science in Biology* Expected 2020  
Principal Investigator: Dr. Ryan McEwan *University of Dayton, Ohio*

- Studying drivers of Larch regeneration and succession in the rapidly changing environment of the Arctic Circle. Specifically, characterizing the variable density levels of Larch recruitment post-fire and examining the relationship ectomycorrhizal fungi have to Larch seedlings. I cultivated this project through the scientific process from planning and design, to data management and analysis and expected publication.
- Participate in month long fieldwork expedition in remote locations to gather data for Master's Thesis and publication.
- Collaborate and foster relationships with international scientists to fuel research in remote/ foreign regions.
- Harvest and process seedling root systems to measure mycorrhizal presence on *Larix cajanderi*
- Compile and store data collected in the field for analysis and distribution
- Analyze data using R statistical software
- Assist graduate students and local MetroParks in field work based in restoration and invasion ecology, including prescribed burnings
- Construct prescribed burn and competition exclusion plots to examine recruitment processes in species *L.cajanderi*
  - Participate in fieldwork examining seed predation using field cameras for *L. cajanderi* and native OH tree seeds

- Lead Undergraduate students in field and lab experiences (invasive species removal, native seed collection, native tree ID, and mycorrhizal protocols)
- Sand and analyze tree core samples to gather stand age data for sampling sites
- Mentor undergraduates in Thesis project design and future career goals

*Undergraduate Researcher*

May 2014-May 2015

Principal Investigator: Dr. Ryan McEwan

University of Dayton, Ohio

- Lead, organize, and participate in experimental site reconnaissance
- Refining of methods and experiment design
- Testing effects of invasive plant leachate on native Ohio seed germination (Spring 2015)
- Examining the effect leaves and berries of *L. maackii* has on seed germination, plant height, and leaf production of the herbaceous species *Brassica rapa* and the woody plant *L. maackii* over a 30 day growing period (Spring 2014)
- Investigating the reach of debris (fruit, flower, leaves) from the invasive species *Lonicera maackii* from an area of invasion into an area of removal in a riparian system over one growing season (Fall 2013-Spring 2014)

## **PUBLICATIONS**

### *Open source datasets*

- Heather Alexander, Jennie DeMarco, Rebecca Hewitt, Jeremy Lichstein, Michael Loranty, **et al.** 2018. Fire influences on forest recovery and associated climate feedbacks in Siberian Larch Forests, Russia, June-July 2018. Arctic Data Center. urn:uuid:6528dc87-970c-412d-a168-4518f10e32d6.

### *In preparation*

- Woods, MJ, **Frankenberg, S.J.**, Juodvalkis, J, Lloyd, MC, McEwan, RW. What makes a successful forest restoration? Using seedling growth as a metric to assess forest recovery from agriculture. In prep.

## **RESEARCH PRESENTATIONS**

### *Invited Seminar Speaker*

- **Frankenberg, S.J.**, and R.W. McEwan. 2019. Fire, Forest, Ice, and Fungi: Exploring the mesh of relationships driving seedling recruitment in the Siberian Arctic. Wright State University, Biology Department EcoSeminar (Dayton, OH, October 2019)

### *Scientific Meetings/ Conferences*

- **Frankenberg, S.J.**, Ryan W. McEwan, Heather D. Alexander, Alison K. Paulson, Rebecca E. Hewitt, Jennie DeMarco. 2019. Fire, Forest, Ice, and Fungi: Exploring the mesh of relationships driving seedling recruitment in the Siberian Arctic. American Geophysical Union Fall Meeting (San Francisco, CA, December 2019)
- Heather Dawn Alexander, Alison Paulson, Jennie DeMarco, Jeremy W. Lichstein, Michael M. Loranty, Michelle C. Mack, Rebecca E. Hewitt, Ryan W McEwan, Eric Borth, **Sarah J. Frankenberg**, Nikita Zimov, Sergey P. Davydov and Valentin Spektor. 2019. Post-fire larch recruitment patterns in the Siberian Arctic indicate forest loss in many areas. American Geophysical Union Fall Meeting (San Francisco, CA, December 2019)

- Jennie DeMarco, **Sarah J. Frankenberg**, Alison Paulson, Heather Dawn Alexander, Jeremy W Lichstein, Eric Borth, Rebecca E Hewitt, Michael M Loranty, Michelle C Mack and Ryan W. McEwan. 2019. Post-fire seedling recruitment in high-latitude Siberian Larch (*Larix cajanderi*) forests associated with lower graminoid composition. American Geophysical Union Fall Meeting (San Francisco, CA, December 2019)
- **Frankenberg, S.J.**, and R.W. McEwan. 2019. Fire, Forest, Ice, and Fungi: Exploring the mesh of relationships driving seedling recruitment in the Siberian Arctic. Ecological Society of America Conference (Louisville, KY, August 2019)
- **Frankenberg, S.J.**, and R.W. McEwan. 2019. Fire, Forest, Ice, and Fungi: Exploring the mesh of relationships driving seedling recruitment in the Siberian Arctic. University of Dayton Stander Symposium (Dayton, OH, April 2019)
- **Frankenberg, S.J.**, O’Callaghan, H.L. and R.W. McEwan. 2014. Reach of *Lonicera maackii* debris from an area of invasion to an area of removal. Midwest Ecology and Evolution Conference (Dayton, OH, March 2014)
- **Frankenberg, S.J.**, O’Callaghan, H.L. and R.W. McEwan. 2014. Reach of *Lonicera maackii* debris from an area of invasion to an area of removal. University of Dayton Stander Symposium (Dayton, OH, April 2014)

## **TECHNICAL REPORTS**

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Custer, K.W., **S.J. Frankenberg**, E.B. Borth, S.N. Eisele, R.W. McEwan. 2015. Water quality effects of urban outfalls along sections of the Great Miami River, Mad River, and Wolf Creek – 2015. City of Dayton, Environmental Management Department, Final Report, pp 50.

## **TEACHING EXPERIENCE**

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*Graduate Teaching Assistant* Spring 2019  
Invertebrate Zoology Laboratory University of Dayton, Ohio  
 • Lecture on invertebrate species structure and lead lab exercises on specimen dissection and slide preparation. Prepared and proctored practical examinations, responsible for grading.

*Undergraduate Teaching Assistant* Spring 2015  
Invertebrate Zoology Laboratory University of Dayton, Ohio  
 • Assist students with slide and specimen preparation along with the preparation of lab examination materials. Full knowledge of course material used.

## **PROFESSIONAL EXPERIENCE**

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*Native Plant Intern- AmeriCorps Service Term* October 2017-April 2018  
Song Dog Native Plant Nursery, Lake Mead NRA Great Basin Institute, Nevada  
 • Propagate and care for forbs, cacti, shrubs, trees, and graminoids native to the Mojave Desert Ecosystem  
 • Research propagation techniques for *Larrea tridentata* and *Encelia farinosa* via cuttings. Testing chemical and physical effectiveness in stimulating and promoting root growth in cutting material taken from mature individuals  
 • Monitor growth of native plants and work to promote growth and optimal plant health

- Work with Nevada Conservation Corps planting native species along slopes of Hoover Dam interstate restoration project (digging using pick-mattock, watering using backpack sprayers) for Park Service
- Lead and train volunteers and NCC crew in transplanting techniques of native forbs using Nursery soil mixes and protocols, lead crews in daily Nursery maintenance tasks
- Assist Nursery and Education staff by leading field trip activities for elementary level groups
- Perform regular checks on nursery beds and greenhouses to prevent weed/fungus growth, rodent disturbance, and monitor irrigation quality
- Responsible for watering schedule and duties for all beds in nursery- Operate time clock managing automatic irrigation schedules for nursery yard, beds and greenhouses
- Maintain Propagation Log to record germination of planted seeds, plant progress, propagation techniques and anticipate transplanting needs
- Update Nursery Log daily to track nursery changes such as watering schedules, transplanting, plant health, exposure, and treatments for later reference
- Stratification of seed through scarification, temperature, and pre-soak treatments
- Construct and manipulate irrigation lines on nursery beds to fit seasonal needs of plants
- Participate in rare plant species survey for Las Vegas Bear Poppy in Lake Mead NRA
- Apply insecticide and fungicide to affected plants
- Winterization of nursery beds with Hoop House Installation
- Collect and manipulate weather station data to determine local nursery climate
- Inventory seedlings and plants in varying growth stages for project planning
- Prepare plants for pick up by project partners by removing foreign debris/seeds and weeds
- Work side by side with NPS volunteers in transplanting individual plants
- Collect and process compost from park offices to be reduced into organic soil at the nursery
- Prepare "soil-less substrate" based on protocol in bulk for upcoming planting projects
- Prepare a Quarterly Report for AmeriCorps and Great Basin Institute detailing daily and long term project goals and progress

*Biological Science Technician*

Vegetation Department, National Park Service

May 2017-October 2017

Yellowstone NP, Gardiner, MT

- Identify Rocky Mountain Vegetation including forbs, graminoids, and woody species
- Trained by an NCRS professional in US Army Corps of Engineer protocol in Wetland Delineation
- Analyze landscapes for wetland qualities by evaluating hydric soils, hydrology, and vegetation communities
- Monitor wetland progression via plant surveys along reclaimed wetlands post construction
- Evaluate soils for hydric qualities based on color and texture for Wetland Determination using Munsell's soil chart and USDA Texture Triangle
- Use GPS Pathfinder unit to map wetlands and areas of interest
- Install groundwater wells to monitor water levels using data loggers (WinSitu)
- Manual collection of groundwater well data along Gibbon River
- Trained by an NCRS professional in seed collection techniques including seed readiness, quality and storage
- Collect native seed of multiple plant species for the Yellowstone Vegetation Program for restoration projects in YNP

- Track flowering, bolting, and location of native forbs and graminoids using a Native Plant Seed Database for later seed collection using a Microsoft Access database
- Use dichotomous key to identify unknown plants to species
- Collect and press voucher specimens in the field for preparation for Yellowstone NP Herbarium
- Lead and train volunteer groups in plant identification, weed pulling, and seed collection techniques, age ranges from high school to retirees.
- Lead and train volunteer groups in native plant harvesting and transplantation for riparian restoration (elementary school groups), as well as habitat restoration and native reseeding in overused alpine area (ages high school to retirees).
- Conduct survey for rare species *Gymnosteris parvula* in YNP prior to construction to evaluate impact potential

*Lab Intern*

September 2015-April 2016

Principal Investigator: Dr. Kelly Dorgan

Dauphin Island Sea Lab, Alabama

- Personal project focusing on the lifecycle, behavior, and oyster shell boring mechanism of mud blister worms.
- Personal project concerning the metabolism of oxygen by macrofauna found in marine benthic environments
- Examine infestation level of mudblister worms in oysters depending on season and other factors
- Complete sediment analysis (porosity, grain size, C:N)
- Contribute to polychaete sample processing under scope
- Investigate mud blister worm larvae culture methods
- Lead field work and data analysis (R Software) of personal projects

*Ecological Research Technician*

May 2015-July 2015

Principal Investigator: Dr. Ryan McEwan

University of Dayton, Ohio

- Assist staff with duties pertaining to Amur Honeysuckle grant and City of Dayton Stormwater Biomonitoring Project
- Organize and participate in field site selection for NSF funded project
- Used Plant taxonomy skills to identify trees to genus and species in the field.
- Train and lead undergraduate technicians on culture techniques, tree identification, and project objectives/goals
- Establish and maintain *Daphnia magna* and *Hyalella azteca* cultures
- Testing of an Amur Honeysuckle effect on *D. magna* and *H. azteca* and stream invertebrate communities
- Assisted with USEPA acute and chronic toxicity tests with effluent water and stream sediments using *D. magna* and *H. azteca*
- Laboratory and field-testing of physicochemical parameters on ambient water: temperature, dissolved oxygen, conductivity, hardness, alkalinity, pH
- Macroinvertebrate sampling using D-frame dip nets, surber sampler, and kick seines
- Collecting, sorting, and preserving aquatic macroinvertebrates
- Instrumentation: YSI 650 and YSI Professional Series handheld units, balances, muffle furnace, ovens, and autoclave

- Created an outline of research to be approved by the International Review Board of OhioHealth

## **SKILLS**

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### *Field*

- Use drip torch / blow torch to treat invasive species with prescribed fire
- Vegetation surveys using point-intercept and percent cover method
- Minor vegetation identification experience in the Siberian Arctic
- Irrigation Repair and manipulation
- Leading field crews
- Plant propagation from seed and clippings
- Transplanting of forbs and shrub species
- Rodent management
- Installation of groundwater wells
- Collection of native seed in Greater Yellowstone and Mojave Desert Ecosystems
- Plant Identification and classification in Greater Yellowstone Ecosystem
- Wetland community plant identification
- Wetland surveying and mapping
- Location mapping using portable GPS unit
- Soil classification using Munsell's chart and USDA soil triangle
- Track phenology of native plant species
- Plant pruning techniques
- Transplanting immature plant species
- Restoring habitats via transplanting
- Erosion control and trail maintenance
- Plant watering techniques
- Proficient in tree classification to genus and species
- Project construction with PVC
- Tree core sample preparation
- Plot Design
- Macroinvertebrate field collections following USEPA Rapid Bioassessment Protocol with D-frame kicknet, Surber sampling, and kick siene
- Water and sediment collection methodology
- Beginner experience in Macroinvertebrate identification
- Familiar with Amur Honeysuckle (invasive species) removal techniques
- Training in use of SonTrek FlowTracker
- Herbaceous plant classification
- Proficient in measuring canopy cover using Densiometer
- Plankton sampling using Niskin Bottle
- Marine polychaete sample collection
- Comfortable working on boats (and barges) for long periods of time
- Experience in hiking and backpacking in humid and dry climates
- Hike 20+ miles daily with 30lb gear pack

### *Laboratory*

- Calibration and use of YSI probes
- Scarification and stratification of seed
- Maintenance of Nursery and propagation logs
- Manipulate data in Access Databases
- Seed cleaning and processing using a shaker
- Proficient in permanent slide preparation
- Training in invertebrate specimen dissection
- Some training in use of microtome for specimen preparation
- Experience with plant growth using a growth chamber
- Seed germination techniques
- Training in Hach Water Quality Testing
- Sediment analysis: porosity sample processing
- Grain Size Analysis sample processing
- Carbon:Nitrogen sediment testing

- Use of Muffle Furnace

- Quantify ectomycorrhizae on *Larix cajanderi* root systems

*Technical*

- WinDENDRO- Tree Ring Analysis
- R - Statistical Software
- Trimble/ PathFinder GPS unit
- HOBOware Weather station analysis
- ArcMap- ArcGIS 10.1
- ERDAS Imagine 2015
- Prism
- Google Drive
- ImageJ
- WinSitu

**OTHER EXPERIENCES**

*Aquatic Botanist Field Work Volunteer* August 2016  
 Vegetation Department, National Park Service Yellowstone NP, Gardiner, MT

- Lead by Dr. Eric Hellquist, locate and collect field specimens of native aquatic plant species found in Yellowstone National Park ecosystems contributing to an overall catalog of aquatic plants found in the park
- Located rare species of pondweed (obtuse-leaved pondweed) that will be featured in the Yellowstone Herbarium

*Yellowstone Vegetation Program Volunteer* July 2016 – October 2016  
 Vegetation Department, National Park Service Yellowstone NP, Gardiner, MT

- Trained by Park Botanist in plant identification of native plants, nonnative plants (spotted knapweed, cheatgrass) and two park endemics (Sulfur Buckwheat and Ross' Bentgrass) at Old Faithful
- Collected seed for multiple native species for the Yellowstone Vegetation Program; making native plant material available for individual projects at Old Faithful.
- Trained another volunteer on seed collection and native species identification in the Old Faithful area.

*Yellowstone Vegetation Program Volunteer* May 2016 – October 2016  
 Old Faithful Backcountry Office, National Park Service Yellowstone NP, Gardiner, MT

- Assist in trail management: clearing of debris and downed trees from backcountry trails

*Geographic Information Systems Workshop* January 2016  
 Dauphin Island Sea Lab

- Overview of GIS techniques

*Alabama Coastal Clean Up Volunteer* September 2015  
 Dauphin Island Sea Lab

- Debris/ trash removal from Little Dauphin Island

*Conference Volunteer* March 2014  
 Midwest Ecology & Evolution Conference Dayton, OH

- Moderated oral presentation session

*Marianist Hall Learning Space Support Specialist*  
University of Dayton, Student Employment

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August 2013-May 2015

- Solve technological problems with computers, DVD players & projectors
- Manage noise level and use of the space by faculty and student community.

*Beta Beta Beta Honors Biological Society Member*  
University of Dayton

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2011-2015

- Attend research seminars at UD
- Long term volunteering on/off campus-Science Olympiad tutor for students ages 12-14.

### **RELEVANT COURSEWORK**

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| • Applied GIS             | • Introduction to GIS                      |
| • Introductory Statistics | • Remote Sensing                           |
| • Entomology              | • Advanced Applied GIS                     |
| • Vertebrate Zoology      | • Biological Analysis (Introduction to R)  |
| • Environmental Ecology   | • Plant Diversity and Ecology + Laboratory |
| • Environmental Ethics    | • General Microbiology + Laboratory        |
| • Religion and Ecology    | • Invertebrate Zoology + Laboratory        |
| • Evolution & Development | • Ecosystem Ecology (Graduate)             |
| • The Dynamic Earth       | • Biometrics (Graduate)                    |