

**Sander Bennett Boisen, B. Sc, M.Sc.**  
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## EDUCATION

*Doctor of Philosophy (Ph. D.), Biology* September 2016 – Present  
Memorial University

*Master of Science (M. Sc.), Biology* September 2014 – August 2016  
Aarhus University, Ecoinformatics department  
Thesis: "The diversification of southern taxa"  
Supervisor: Dr. Anders Barfod

*Bachelor of Science (B. Sc.), Biology* August 2011 – September 2014  
Minor in Data Science  
Aarhus University

Whenever possible I have taken courses in botany, statistics, bioinformatics, and ecology.  
My Ph. D. is focussed around community and conservation ecology of Newfoundland plants and plant communities.

## Research experience

*Doctoral research* September 2016 – present  
Memorial University of Newfoundland, St. John's NL  
Plant Diversity and Evolution lab.

- Thesis work related community ecology of Newfoundland plant habitats and conservation genetics of two endemic plant species

*Master's degree research* August 2014 – August 2016

- I finished my master's thesis titled: "The Diversification of Southern Taxa" at the Ecoinformatics and Biodiversity department with Anders Barfod as my advisor. I worked with cophylogenetic reconstruction of southern plant families and plate tectonic scenarios.
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*Application of phylogenies in the Rocky Mountains plant-pollinator community*  
December 2014 – March 2016

- I worked as a research assistant for dr. Paul CaraDonna. My part of the project focused on the coevolution of plants and pollinators using cophylogenetic methods and phylogenetic bipartite linear models.

*Wheat disease modelling* January 2015 – April 2015

- As part of a project for a food security course I did some research on the effect of crop diversity on pathogenicity of wheat rust. I carried this topic with me to a modelling

course (Modelling of Biological processes) where my final project was report on a dynamic modelling of spore dispersion in a wheat field. The software handling the modelling was built from scratch in Java by myself. The model incorporated genetic diversity in the wheat to examine the effect genetic diversity for disease resistance in the wheat field on disease severity.

*Bachelor's thesis*

*April 2014 – June 2014*

My bachelor's thesis was on the use of phylogenies in the study of community assembly with focus on Danish heathlands. My analysis was based on the publicly funded NOVANA dataset containing more than 1 million observations in heathlands.

**EMPLOYMENT**

2018 October – December: Teaching assistant in Biol 2600, Principles of Ecology course at Memorial University of Newfoundland

2018 February – October: Employed by the Species Status assessment committee to reassess the conservation status of 4 endangered plants in Newfoundland.

2018 January – April: Teaching assistant in Biol 2010, Biology of Plants course at Memorial University of Newfoundland.

2018 February – September: Writer of four species status reports for the Species Status Advisory Committee on Newfoundland.

2017 October – December: Teaching assistant in Biol 2600, Ecology course at Memorial University of Newfoundland

2017 January – April: Teaching assistant in Biol 2010, Biology of Plants course at Memorial University of Newfoundland.

2016 September – 2017 April: Teaching assistant in the course "Biology 1001 – An introduction to biology" at Memorial

2015 October – December: Teaching assistant in the botany part of the course "Eukaryotes – Algae, Fungi and Plants"

2014 September – October: Teaching assistant in mycology part of the course "Eukaryotes – Algae, Fungi and Plants"

2013 Aug. – 2014 June: Assistant teacher at Tilst Gymnasium (high school)

**Teaching Experience:**

I have taught the following courses:

*Teaching assistant in the botany part of the course "Eukaryotes – Algae, Fungi and Plants"*

I had two classes of about 25 students. My responsibility included classroom presentations of plant anatomy and lifecycles as well as slide demonstration, material collection and report marking.

*Teaching assistant in mycology part of the course "Eukaryotes – Algae, Fungi and Plants"*

I had two classes of about 25 students and corrected the 3 obligatory assignments. My responsibilities included microscopy and slide preparation, classroom presentations of lifecycles and ecology, as well as guiding 2 field tours with in the field identification of fungi.

*Teaching assistant in the course "Biology 1001 – An introduction to biology" at Memorial*

In this course I have helped bring new students into the biological sciences. In this course we have worked with a broad range of organisms and slide preparations. I have held this position 5 times.

*Teaching assistant in Biol 2010, Biology of Plants course at Memorial University of Newfoundland.*

This course covers basic plant anatomy, evolution, life cycle, cellular anatomy and ecology. I have held this position 2 times and look forward to the third this fall. My responsibilities in this course include assisting the Instructor on field trips, as well as slide preparation and classroom discussion of theory.

*Teaching assistant in Biol 2600, Ecology course at Memorial University of Newfoundland*

This course touches on many aspects of ecology as well as many branches of the tree of life. About half the labs are field based and include several labs with plant identification. My main responsibilities in this course have been guiding discussion in the field and lab and marking a substantial term paper. I have held this position 3 times.

*Assistant teacher at Tilst Gymnasium (high school)*

The position involved teaching mandatory biology for juniors (Grade 10) at the Tilst High School. I would be alone with 15-32 students depending on the situation and day. My responsibilities included classroom presentations, experiment supervision and in class revisions.

**Publications and Technical Reports:**

SSAC, *awaiting publication*, The Status of Northern Bog Aster (*Symphyotrichum boreale*) in Newfoundland and Labrador

SSAC, *awaiting publication*, The Status of Rattlesnakeroot (*Nabalus racemosus*) in Newfoundland and Labrador

SSAC, *awaiting publication*, The Status of Mackenzie's Sweetvetch (*Hedysarum boreale* subsp. *mackenziei*) in Newfoundland and Labrador

SSAC, *awaiting publication*, The Status of Crowded Wormseed Mustard (*Erysimum inconspicuum* var *coarctatum*) in Newfoundland and Labrador

**Conference presentations:**

*Clade-Specific Patterns of Phylogenetic Community Structure, Canadian Society for Ecology and Evolution meeting, Guelph University, 2018*

**Volunteer experience:***R-bar presentation on multivariate statistics, 2018*

In November 2018 I gave a live coding presentation on multivariate statistics open for students at Memorial University. As part of my volunteering with *R-bar* I have also helped students make sense of their code and data.

*Newfoundland Symphony Orchestra, August 2018 – Present*

I volunteer on a regular basis for the NSO. I enjoy classical music and believe this is the best way to give back to the orchestra.

*Science Rendezvous, 2017*

I joined MUN instructors in teaching biology to children of all ages and their parents. I enjoyed inspiring excitement about the botany of fruits and flower.

**Skills and knowledge****Ecology:**

- Broad understanding of ecology on different scales: from population to macroecology
- An evolutionary approach to ecology based on phylogenetics.
- A thorough understanding of island ecology
- Vegetation ecology in temperate and boreal environments
- Experience with community ecology and associated data
- Strong understanding of phylogeography
- Strong competences in conservation ecology
- Understanding of biodiversity and its importance to ecology
- Some Knowledge of Network Theory

I have completed a wide variety of courses on different aspects of ecology, including population and conservation ecology. I work with community ecology in Newfoundland anchored in phylogenetics. Currently I am preparing to branch out into population and conservation ecology of *Braya fernaldii* and *B. longyi* based on genomics data. I have a thorough knowledge of statistical analyses and measures used in the community ecology. I did my comprehensive examination on the topic: "How has phylogenetics contributed to the theory of Island biogeography". In the exam I covered both classic biogeography and community assembly on multiple geographic scales.

**Botany:**

- Large amount of field experience
- Knowledge of temperate European and North American flora
- Excellent at identification
- Interest in taxonomy
- Deep and comprehensive systematic knowledge

I have had 3 courses worth of training in the identification of plants. Through these courses and personal outings, I have gained a lot of field experience. My knowledge of plants is anchored in a passion for their systematics and taxonomy. I have a general knowledge of plants diversity on a global scale with specific knowledge of temperate of the Northern Atlantic Maritimes.

**Mycology:**

- Substantial field experience
- Broad knowledge about fungal taxonomy
- Extensive knowledge of fungal systematics
- Extensive knowledge of fungal ecology
- Deep knowledge of saprophytic and plant pathogenic fungi

Mycology was one of my first interests in biology. I have maintained my skills in mycology on my own time and have experience with mycology in both ecological, systematic and agroecological context. The importance of fungi for plant ecology is hard to underestimate.

**Bryology:**

- Experience with moss identification under field and lab conditions
- Knowledge of the ecology and importance of mosses
- Knowledge of the systematics of mosses
- Knowledge of functional diversity of mosses

**Statistics skills:**

- Strong foundation in basic statistics.
  - Knowledge of the right analysis for the right data set
  - Frequentist statistics
  - Bayesian parameter estimation
  - Maximum Entropy Inference
  - Generalized Linear models
  - Experience with classical statistical tests and models
- Practical experience with community phylogenetic statistics including:
  - Net Relatedness Index (Webb et al. 2002)
  - Mean Pairwise Distance (Webb et al. 2002)
  - Blomberg's K (Blomberg et al. 2003)
  - Pagel's Lambda (Pagel 1999)
  - Phylogenetic Bipartite Linear Modelling (Ives and Godfray 2006)
  - Parsimony-based tree fitting (Ronquist 2003)
- Experienced R user:
  - Experience with data wrangling in R
  - Experience with handling and visualizing large datasets in R.
  - Experience with multivariate analysis including a variety of ordination and visualization techniques.
  - Experience with spatial data in R.
  - And many other techniques and methods
- Programming and modelling experience

- Experience with dynamic modelling
- Experience with Agent based modelling
- Experience with Java, Python, C++, PHP and R
- Experience with GUI programming

I have a good understanding and intuition for statistics and mathematics in general. I have experience in handling and visualising large datasets in R. I have a thorough understanding of which questions can be answered with different statistical analyses.

**Other skills:**

- Wet-laboratory skills
- Experience with gathering data from online sources and databases
- Experience with GBIF database

**FURTHER INFORMATION**

I was an active member of the field trip association on the campus of Aarhus University, the cashier of a Live Action Roleplaying club with approximately 200 members and a \$20,000 budget. I am an active board gamer and lover of science fiction. I have a keen interest in local and natural history and I am constantly curious to learn more about my surroundings. I am a hard worker, but I try to remember to take the necessary breaks to remain efficient. I am married and live with my partner near MUN in St. John's