

# Johannes Nelson

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## EDUCATION

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**University of Pennsylvania** - Philadelphia, PA

August 2021 - August 2023

- Master of Environmental Studies
  - Individualized concentration in Machine Learning and Bioacoustics for Conservation
  - Relevant Coursework: *Applied Machine Learning* | *Deep Learning for Data Science* | *Statistical Computing in R* | *Bioacoustic Monitoring: Principles and Practice* | *Ornithological Principles* | *Occupancy Modeling*

**Colorado College** –B.A. English Literature

September 2009 – May 2011

- B.A. English Literature

**National Outdoor Leadership School (NOLS)** – Southwest USA

January 2009 – May 2009

## TECHNICAL SKILLS

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**Programming and Data Analysis:** R, Python, PyTorch, ArcGIS Pro, Bioacoustics, Machine Learning, Deep Learning

**Ecological Fieldwork:** Bird banding (songbirds and northern saw-whet owls), mist-net operations, point counts, nest searching, field botany, passive acoustic monitoring, occupancy modeling, distance sampling

## RESEARCH/PROJECTS

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**Passive Acoustic Monitoring Study of Rail Community**

May 2022

- Planned and executed passive acoustic monitoring survey for the purposes of improving Virginia rail distribution data–recording over 1,000 hours at 28 sites
- Developed and implemented R scripts to enable streamlined validation and analysis of detections from deep learning audio classification models
- Used occupancy modeling framework to analyze detection data and to assess impact of covariates

**Developing Convolutional Neural Network for Acoustic Monitoring of Rare or Cryptic Species**

March 2023

- Curated and preprocessed audio training datasets using R and Python, sourcing from public databases
- Leveraged the PyTorch library to experiment with sophisticated deep learning architectures and innovative data augmentation techniques–ultimately creating and deploying an ensemble of ResNets
- Wrote detailed technical report on model development and training
- Leveraged GitHub for version control and codesharing (Repository: RailNET)

**Gather Baseline Data for Restoration Project using Passive Acoustic Monitoring**

April 2023

- Collaborated with National Wildlife Refuge to conduct passive acoustic monitoring survey of degraded urban marsh to establish avian community baseline data ahead of restoration project
- Used combination of custom-trained and pre-existing deep learning models to monitor cryptic marsh bird community
- Used relational database (SQLite) to manage project data such as detections, deployments, locations, and equipment.

## PROFESSIONAL EXPERIENCE

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### **Conservation International** – Arlington, VA

October 2023 - Current

#### *Data Analysis Consultant*

- Short-term consultancy to streamline and automate data wrangling/analysis of tree monitoring data for the Priceless Planet Coalition, a partnership with MasterCard which includes a large portfolio of global restoration projects in more than twenty countries around the world.
- Created an extensive codebase of R scripts enabling non-technical users to run incoming data through multiple modular components of a multi-faceted data pipeline.
- Developed automated and semi-automated processes within the pipeline to flag invasive species and to classify planted species as native/alien based on geolocation data, occurrence information, and relevant text extracted and parsed from plant databases
- Leveraged the LangChain library in Python to engineer prompts and develop a workflow to automatically parse relevant textual data in order to make classification decisions and provide sound, cited reasoning.

### **Willistown Conservation Trust** – Newtown Square, PA

June 2022 - August 2022

#### *Field Technician - Eastern Towhee Project*

- Assisted lead researcher in nest searching, active mist-netting, trapping, banding, and MOTUS tagging of Eastern Towhees

### **Carol Morgan School**– Santo Domingo, Dominican Republic

August 2019 - June 2021

#### *5<sup>th</sup> Grade Social Studies Teacher*

- Designed units of study focused on the social and environmental impacts of a linear, materials economy; bias and power in historical narratives; and how resource management choices impact social and environmental welfare

### **International School of Dakar** – Dakar, Senegal

August 2017 – June 2019

#### *5<sup>th</sup> Grade IB Primary Years Program (PYP) Teacher*

- Taught students from 15+ nationalities and fostered a culture of empathy, collaboration, and open-mindedness
- Aided in the school's transition into the IB Primary Years Program—an interdisciplinary, inquiry-based approach
- Planned field experiences for students to make connections to local communities and ecosystems while learning about key resource management issues in the region such as overfishing, desertification, and food scarcity

### **International College** – Beirut, Lebanon

August 2014 – June 2017

#### *English Department Head & 5<sup>th</sup> Grade Teacher*

- Worked in a leadership role with 30+ teachers of varying cultural, religious, linguistic, and ethnic backgrounds
- Planned and implemented curriculum on topics such as urban planning, living systems, and human rights

### **International School of Monagas** – Maturin, Venezuela

August 2011 – June 2012

#### *Middle/High School English, Drama, History Teacher*

- Taught students from a wide variety of socio-economic backgrounds with limited resources
- Planned and led multiple overnight field trips into the Orinoco River Delta where students learned from indigenous teachers about local culture, flora and fauna

## COMMUNITY INVOLVEMENT

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### **Great Marsh Institute** - *Member of Scientific Advisory Board*

- Regularly meet to report on and advise scientific research at the Great Marsh, to plan and participate in public outreach events

### **Rushton Woods Banding Station** - *Bird Banding Technician*

- Assist banders in charge with mist-net operations, processing, banding, and data collection for both migratory songbirds and northern saw-whet owls.

## ADDITIONAL INFORMATION

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**Languages:** English (native), German (advanced), Spanish (advanced), Italian (intermediate), Arabic (beginner/intermediate)

**Interests:** Birding, writing, programming, surfing, travel, photography, tabletop and video games, rock climbing, hiking