

SYDNEY BIRCH

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Dover, NH, 03820

EDUCATION

- PhD** University of New Hampshire, In Progress
Molecular Evolution and Systems Biology
Dissertation Topic: Sensory Systems of Hydrozoans
Minor: College Teaching
Committee: Dr. David Plachetzki (chair), Dr. Matt MacManes, Dr. W. Kelley
Thomas, Dr. Arturo Andrade, Dr. Jennifer Dijkstra
- BS** Michigan State University, *Zoology* May 2014
Specializations: Marine Biology, Animal Behavior and Neurobiology

HONORS AND AWARDS

- NSF Graduate Research Fellowship Program (GRFP)** Spring 2019
National Science Foundation
- 3 Minute Thesis Competition 1st Place Awardee** 2019
UNH competition among graduate students to present research in 3 minutes
- Graduate Research Assistantship** Fall 2017, Fall 2018
University of New Hampshire Spring 2019
- Graduate Teaching Assistantship** Spring 2018
University of New Hampshire
- Research Communication Academy Participant** 2019
Selective program offered through UNH to develop research communication
- Broadening Participation Award** 2018
Society for Integrative and Comparative Biology
- Charlotte Magnum Award** 2018
Society for Integrative and Comparative Biology
- Travel Award** 2018
Graduate School of UNH
- Travel Award** 2018

Cnidarian Model Systems Meeting

Dean's List Recipient
Michigan State University

Fall 2010, Fall 2011
Spring 2012, Fall 2014

RESEARCH EXPERIENCE

Sensory Systems of Hydrozoa, UNH, Durham In Progress
Advisor: Dr. David Plachetzki

- Creating knock-out and knock-in transgenic *Hydra* using the CRISPR/Cas9 system
- Examining the molecular genetics underlying the settlement behavioral response to environmental cues of *Ectopleura crocea* (actinula) larva via RNA-Seq and DESeq2
- Applying bioinformatics techniques to examine phylogenetic relationships of vertebrate opsins

Michigan State University, East Lansing 2012 – 2014
Undergraduate Research, Dr. Michael Gottfried

- Performed complete dissection of shark pectoral fins
- Conducted analysis of evolutionary changes in shark pectoral fins by using comparative approach

TEACHING EXPERIENCE

University of New Hampshire, Durham, NH Spring 2018
Graduate Teaching Assistant, Genetics

- Designed and lead recitation sections of 20 students each once a week to enhance undergraduate students' understandings of key concepts from lecture
- Provided office hours once a week to help address students' questions
- Created and graded weekly homework assignments for the course and uploaded assignments online to MyCourses
- Aided in creating and grading exam questions for the course

University of New Hampshire, Durham, NH Fall 2017 – Present
Graduate Student Mentor, The Plachetzki Lab

- Teaching undergraduate students in the lab how to use molecular biology tools such as PCR, gel-electrophoresis, RNA and DNA extractions, and DNA Library Prep
- Providing weekly instructions, guidance, and deadlines for active research
- Creating a schedule and instructing undergraduate students in the lab how to care for *Hydra*

WyzAnt Tutor, Livonia, MI Fall 2015 – Spring 2016
Certified Tutor, Zoology, Biology, and Ecology

- Tutored high school students in the above topics by creating objectives based on course syllabus, explained concepts and theories, and answered questions about the material

Michigan State University, East Lansing, MI Fall 2013 – Fall 2014
Undergraduate Teaching Assistant, Applications of Environmental and Organismal Populations

- Collaborated on curriculum and exam development and graded all written work including final exam papers
- Held office hours and met with students upon request

PROFESSIONAL WORK EXPERIENCE

United Road Transportation, Livonia, MI Feb. 2017 – Aug. 2017
Account Coordinator (*promotion*)

- Managed four sales representatives' new business by entering in new orders, acquiring paperwork to meet compliance, and processing payments
- Collaborated with the dispatch department, the accounting department, supervisors, dealerships, and clients to solve problems if any arose at any step of the process

United Road Transportation, Livonia, MI June 2016 – Feb. 2017
Pre-Qualifying Administrative Assistant

- Collaborated with co-workers and other departments on reports and presented information to supervisors
- Verified qualifying information for vehicle transport, determined if the vehicle met guidelines, and activated, canceled, or put orders on hold

Medwest Medical Supply (Rotech Health Care), Livonia, MI Sept. 2015 – June 2016
Customer Service Representative II

- Communicated with patients and referral sources both verbally and in writing to ensure patient questions and concerns were processed in a timely manner
- Coordinated all patient information, processed paperwork, including preparation of file for the billing department, compliance team, and assisted with patient setups
- Worked directly with sales representatives, local and regional managers, medical professionals, and customers to insure all paperwork was processed properly

Great Lakes Environmental Center Inc., East Lansing, MI Nov. 2014 – June 2015
Diatom Laboratory Technician Assistant

- Handled glassware, micropipettes, and chemicals in a professional and safe manner
- Acid cleaned diatoms and created microscope slides using Naphrax

- Calculated dilutions for chemical solutions and properly labeled dilutions of diatom solutions on microscope slides

Michigan State University Museum, East Lansing, MI Dec. 2011 – May 2013
Special Collections Undergraduate Assistant

- Handled and classified vertebrate and invertebrate specimens with scientific nomenclature
- Cataloged specimens and their corresponding documentation
- Aided in educational tours to the public and students by describing scientific processes and giving background information on the specimens

RELEVANT COURSE WORK

Bioinformatics, Applied Bioinformatics, Intro to Programing (Python), College Teaching, Course Design, Marine Biology, Oceanography, Marine Ecosystems Management, Neurobiology, Genetics, Evolution, Comparative Genomics

PRESENTATIONS

3 Minute Thesis Presentation for NH Board of Trustees, UNH April 2019
 “Investigating the sensory systems of *Ectopleura larva*”

3 Minute Thesis Competition (Final round – 1st place), UNH April 2019
 “Investigating the sensory systems of *Ectopleura larva*”

UNH Graduate Research Conference, University of New Hampshire April 2019
 Poster: “The genomic characterization of larval settlement in the biofouling invertebrate *Ectopleura larynx*”

3 Minute Thesis Competition (1st round), University of New Hampshire March 2019
 “Investigating the sensory systems of *Ectopleura larva*”

MCBS Departmental Seminar, University of New Hampshire Jan 2019
 “The genomic characterization of larval settlement in the biofouling invertebrate *Ectopleura larynx*”

Society for Integrative and Comparative Biology meeting, Tampa, FL Jan 2019
 Poster: “The genomic characterization of larval settlement in the biofouling invertebrate *Ectopleura larynx*”

Shoals Marine Lab Seminar, Appledore Island, ME June 2018
 “Establishing a transgenic *Hydra magnipapillata* line using CRISPR/Cas9 & The genomic characterization of larval settlement of *E. larynx*”

MCBS Departmental Seminar, University of New Hampshire April 2018

“Establishing a transgenic *Hydra magnipapillata* line using CRISPR/Cas9”

Science Sleuths Presentation, University of New Hampshire
“Spectacular Creatures of the Serengeti”

Jan 2018

PROFESSIONAL TRAINING

Molecular Visualization Workshop

University of New Hampshire, Durham, NH, March 2019

Planning and Writing Successful Grant Proposals Workshop

AtKisson Training Group, LLC, hosted at UNH, March 2019

Alda Center for Communicating Science Workshop

Stony Brook University, hosted at UNH, January 2019

The art of persuasive communication: when acting meets science Workshop

Society for Integrative and Comparative Biology, Tampa, FL, January 2019

Responsible Conduct of Research and Scholarly Activity Certification

University of New Hampshire, Oct. 2017

PROFESSIONAL AFFILIATIONS

Society for Integrative and Comparative Biology, 2018 – Present

National Society of Collegiate Scholars, 2011 – 2014

Charles Drew Science Scholars, 2010 – 2014

PROFESSIONAL SERVICE

Poster Judge for the Junior Science and Humanities Symposia, UNH March 2019

Participated as a poster judge for the Northern New England JSHS High School program

Co-Creator and Vice President of the MSU Shark Club 2013 – 2014

Aimed at promoting education and conservation of sharks, skates and rays

COMMUNITY SERVICE & OUTREACH

Science Sleuths Instructor, University of New Hampshire April 2019 - Present

Introducing science to young children by giving a presentation and providing hands on activities

“Let’s talk about biology and college” Volunteer, UNH March 2019

Volunteered to talk to Dover Middle School students about college, biology, and becoming a scientist.

Science Sleuths Presenter, University of New Hampshire January 2018
Introducing science to young children by giving a presentation and providing hands on activities

MSU Museum's Darwin Day Volunteer, Michigan State University Feb. 2011 & 2012
Led tours for the general public through the MSU Museum's Special Collection Department

Mother Teresa Service Day Clean-Up, Detroit, MI October 2010
Participated in an environmental clean-up in Detroit, MI

COMPUTER SKILLS

Programming: basic LINUX/UNIX, Bash, Python, Rstudio

Applications: Microsoft Office, Geneious, FigTree, Seaview, Visual Molecular Dynamics (VMD)

RELEVANT EQUIPMENT AND PROCEDURAL EXPERIENCE

Laboratory Equipment:

- Dissecting microscope – identifying actinulae larvae and injecting *Hydra* embryos with CRISPR/Cas9
- Thermal cycler – used for various protocols such as PCR and DNA Library preps
- Centrifuge – used for various protocols such as PCR purification, DNA and RNA extractions, and Library preps
- Gel doc Imaging System – used for imaging electrophoresis gels
- Tape Station – used for quantifying DNA libraries for sequencing

Laboratory Procedures:

- *Hydra magnipapillata* and *Ectopleura larynx* maintenance and dissection
- Creating homology direct repair templates and gRNAs for CRISPR/Cas9
- Designing primers for PCR via Geneious and Primer3
- Performing PCR and PCR Purification
- Conducting gel electrophoresis with imaging of
- Performing CTAB DNA extractions on *H. magnipapillata*
- Conducting RNA extractions on *Mixini* sp. And *E. larynx*
- Quantifying DNA and RNA from extractions via Qubit, Nanodrop, and tape station
- Creating DNA libraries by using the Poly A - RNA prep protocol
- Designing behavioral experiments analyzing settlement factors for *E. larynx* actinulae

REFERENCES

Dr. David Plachetzki, Assistant Professor
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University of New Hampshire
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