



J. Lisa Hoogenboom

Freshwater fish Physiologist, PDF
Elasmobranch Physiologist, PhD
Marine Biologist, BSc



EDUCATION

Ph.D. Biological Sciences
Elasmobranch Physiology
Advisor: Dr. Gary Anderson
University of Manitoba
Winnipeg, Canada

B.Sc. Marine Biology
Cetacean Ecology
Advisor: Dr. Hal Whitehead
Dalhousie University
Halifax, Canada



CONTACT



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J. Lisa Hoogenboom



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PUBLICATIONS

- 2024 | Hyodo, S. **Hoogenboom, J.L.**, Anderson, W.G. 2024. Osmoregulation in chondrichthyan fishes. In: Alderman, S.L., Gillis, T.E. (Eds.), *Encyclopedia of Fish Physiology*, Vol. 1. Elsevier, Academic Press, pp. 883–892. doi: [dx.doi.org/10.1016/B978-0-323-90801-6.00088-4](https://doi.org/10.1016/B978-0-323-90801-6.00088-4).
- 2023 | **Hoogenboom, J.L.**, Anderson, W.G. 2023. Using ¹⁵N to determine the metabolic fate of dietary nitrogen in North Pacific spiny dogfish (*Squalus acanthias suckleyi*). *Journal of Experimental Biology*. 226(13): jeb244921. doi-org.uml.idm.oclc.org/10.1242/jeb.244921 (Impact 3.308).
- Hoogenboom, J.L.**, Anderson, W.G. 2023. Investigating nitrogen movement in North Pacific spiny dogfish (*Squalus acanthias suckleyi*) with focus on UT, Rhp2, and Rhbg mRNA abundance. *Journal of Comparative Physiology B*. 193:439-451. doi: [10.1007/s00360-023-01487-4](https://doi.org/10.1007/s00360-023-01487-4). (Impact 2.23).
- Hoogenboom, J.L.**, Wong, Marty, K.-S., Hyodo, S., Anderson, W.G. 2023. Nitrogen transporters along the intestinal spiral valve of cloudy catshark (*Scyliorhinus torazame*): Rhp2, Rhbg, and UT. *Comparative Biochemistry and Physiology Part A*. 280:111418. doi: [10.1016/j.cbpa.2023.111418](https://doi.org/10.1016/j.cbpa.2023.111418) (Impact 2.888)
- 2022 | **Hoogenboom, J.L.** 2022 The role of the intestinal spiral valve on whole-body nitrogen homeostasis in marine elasmobranchs. Ph.D. Thesis. Advisor: Dr. W. Gary Anderson, University of Manitoba, Canada.
- 2021 | Weinrauch, A.M., **Hoogenboom, J.L.**, Anderson, W.G. 2021. A review of reductionist methods in fish gastrointestinal tract physiology. *Comparative Biochemistry and Physiology Part B*. 110571. doi.org/10.1016/j.cbpb.2021.110571 (Impact 2.219)
- 2020 | **Hoogenboom, J.L.**, Weinrauch, A.M., Wood, C.M., Anderson, W.G. 2020. The effects of digesting a urea-rich meal on North Pacific spiny dogfish (*Squalus acanthias suckleyi*). *Comparative Biochemistry and Physiology Part A*. 249:110775. doi: [10.1016/j.cbpa.2020.110775](https://doi.org/10.1016/j.cbpa.2020.110775) (Impact 1.966)
- 2019 | Wood, C.M., Liew, H.J., De Boeck, G., **Hoogenboom, J.L.**, Anderson, W.G. 2019. Nitrogen recycling in the elasmobranch gut: a potential role of microbial urease. *Journal of Experimental Biology*. 222(3): [10.1242/jeb.194787](https://doi.org/10.1242/jeb.194787) (Impact 3.014)

- 2015 **Hoogenboom, J.L.**, Wong, S.N., Ronconi, R.A., Koopman, H.N., Murison, L.D., Westgate, A.J. 2015. Environmental predictors and temporal patterns of basking shark (*Cetorhinus maximus*) occurrence in the lower Bay of Fundy, Canada. *Journal of Experimental Marine Biology and Ecology*. 465:24-32. doi:10.1016/j.jembe.2015.01.005 (Impact 1.796)
- 2012 **Hoogenboom, J.L.** 2012. Comparing the prevalence of markings on the flukes of sperm whales (*Physeter macrocephalus*) within the Atlantic and Pacific oceans. B.Sc. Honours Thesis. Advisor: Dr. Hal Whitehead. Dalhousie University, Canada.



CONFERENCES & INVITED LECTURES

- 2022 International Congress on the Biology of Fishes (ICBF), Montpellier, France
Oral presentation: Using ^{15}N to determine the metabolic fate of dietary nitrogen in spiny dogfish
 Canadian Society of Zoologists (CSZ), on-line conference due to Covid-19
Oral presentation: Investigating nitrogen transport in North Pacific spiny dogfish (*Squalus acanthias suckleyi*) with focus on UT, Rhp2, and Rbhg expression
- 2021 University of Manitoba Student Speaker Series (Crackerjack)
Oral presentation: Pilfering from the ecologist's toolbox to investigate physiological questions
 Biology of Mammals Undergraduate Course, University of Manitoba, Canada
Invited speaker: Non-invasive methods for marine mammalogy research
 Canadian Society of Zoologists (CSZ), on-line conference due to Covid-19
Oral presentation: Nitrogen transporters along the intestine of the cloudy catshark (*Scyliorhinus torazame*)
 Darwin Day – Biological Sciences Student Symposium, University of Manitoba, Canada
Oral presentation: Nitrogen transporters along the intestine of catsharks
 Hapnot Collegiate Institute, Flin Flon, Manitoba, Canada
Invited speaker: spoke with a high school career class about career prospects in Science and Marine Biology
- 2019 Society for Experimental Biology (SEB), Seville, Spain
Oral presentation: It's a shark-eat-shark world: nitrogen movement along the gastrointestinal tract of spiny dogfish (*Squalus acanthias suckleyi*) following the ingestion of a urea-rich meal
 Darwin Day – Biological Sciences Student Symposium, University of Manitoba, Canada
Oral presentation: Nitrogen in sharks: what is it good for?
- 2018 Methods of Data Collection and Analysis in Ecology Undergraduate Course, University of Manitoba
Invited lecturer: Stable isotope analysis
 International Congress on the Biology of Fishes (ICBF), University of Calgary, Canada
Oral presentation: Nitrogen movement across the elasmobranch intestine
 Environmental Physiology Undergraduate Course, University of Manitoba, Canada
Invited lecturer: Nitrogen metabolism and elasmobranch osmoregulation
- 2017 Canadian Society of Zoologists (CSZ), University of Manitoba, Canada
Oral presentation: Modeling the transport of nitrogenous compounds across the intestine of North Pacific spiny dogfish (*Squalus acanthias suckleyi*)
- 2014 Society for Petroleum Engineers (SPE) Environmental Impact Workshop, Halifax, Canada
Invited speaker: Passive acoustic monitoring of cetaceans within the oil and gas industry, and how underwater noise affects marine mammals
- 2012 Dalhousie University Biology Undergraduate Honours Conference, Halifax, Canada
Poster presentation: Comparing the prevalence of markings on the flukes of sperm whale (*Physeter macrocephalus*) within the Atlantic and Pacific oceans



LABORATORY, FIELD, & MANAGEMENT SKILLS

Assays

- Urea, ammonia
- Ammonia electrode
- OUC enzymes
- Nitrogen compound separation: protein, ammonia, urea, glutamine, bulk amino acids
- Solution preparation
 - Molarity calculations, pH, dilutions, osmolarity and osmolality

Flux studies

- Ussing chambers
- *In vitro* gut sac preparations
- Radiolabelled isotope flux experiments

Statistical analysis

- *Posit* R (RStudio, tidyverse, ggplot2)
 - t-test, one and two-way anova
 - general linear models

Molecular analysis

- RNA and cDNA isolation
 - Trizol, Isogen, and column extractions
- PCR, qPCR, RT-qPCR
- Gel electrophoresis
- DNA amplification and sequencing
- Primer design and BLAST searches
- Plasmid DNA
 - Insertion into vectors
 - Blue/white bacterial screening

Microscopy

- Immunohistochemistry
 - Bouin's fixation
 - Paraffin embedding, section preparation, and slide mounting
 - Hemotoxylin and eosin staining
 - DAB staining
- *In situ* hybridization
 - Designing RNA-DIG labeled sense and antisense probes
 - NBT and BCIP staining
- Microscope experience
 - Compound and dissecting microscopes
 - Photographic acquisition of microscope slides
 - Troubleshooting operation errors and fixing microscopes

Marine animal husbandry

- Prepared and distributed daily feed for 200 native species of fishes and invertebrates at the Bermuda Aquarium Museum & Zoo
- Cleaned and maintained twenty-six 5000 L aquariums, and a 530,000 L aquarium
- Provided training and daily enrichment for harbour seals

Elasmobranch husbandry and handling

- Wild elasmobranch capture (rod and reel) and live animal transport to Bamfield research station
- Force-feeding via gavage
- Caudal vein blood draws
- Anesthetizing
- Dissection and tissue excision
- Sample preservation for future analyses
- Body measurements/metrics

Marine transect sampling

- Marine mammal and bird identification with specialization of Atlantic Ocean animals (> 3 years experience).
- Passive acoustic monitoring (>2 years experience)
- Photo-ID of marine cetaceans and basking sharks (>5 years experience)
- Benthic ponar-grab sampling
- Plankton net and Niskin bottle sampling

Project Management

- Planned and executed multiple research projects during my PhD tenure, resulting in 5 first-author journal articles, and 8 total publications, including a book chapter in: Encyclopedia of Fish Physiology, Second Edition
- Authored and submitted research proposals, securing funding \$191,125 during my PhD tenure
- Coordinated field research trips and experiments, including equipment preparation, organization, and distribution among team members and other researchers sharing the Research Station
- Successfully managed trip logistics, route planning, sample collection, and equipment sharing to ensure smooth research operations
- Mentored graduate and undergraduate students, providing guidance on laboratory practices, protocols, and procedures
- Created new experimental protocols and refined sample collection and analysis methodologies for experiments, sample collection, and analysis

Time Management

- In addition to conducting my PhD research, I also served on various committees:
 - **President** of the Biological Sciences Graduate Students
 - **Graduate Student Representative** for the Departmental Faculty
 - **Graduate Student Representative** on the University of Manitoba Animal Care Committee
 - **Co-chair** of a National Graduate & Undergraduate Student conference
 - **Graduate Student Representative** on the NSERC Master's Scholarship Award Selection Committee



INTERNATIONAL RESEARCH COLLABORATION

2019	<p>Atmosphere and Ocean Research Institute (AORI) – University of Tokyo, Kashiwa Japan</p> <p>As part of my PhD, I received the NSERC - Michael Smith Foreign Study Supplement Fund to conduct collaborative research with partners at another University. I worked with Dr. Susumu Hyodo and Dr. Marty K.-S. Wong in the AORI Physiology Department for 3 months. Our collaboration paralleled the research I conducted in Canada, allowing for the comparison of two shark species, the Japanese cloudy catshark with the North Pacific spiny dogfish.</p>
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AWARDS & FUNDING – \$210,958

2022	University of Manitoba Fellowship for Educational Purposes	2,625
2021	University of Manitoba Fellowship for Educational Purposes	18,000
2021	University of Manitoba Program Faculty of Graduate Studies Completion Scholarship	2,500
2019	NSERC – Canada Graduate Scholarships Michael Smith Foreign Study Supplement (Grant No. 11020182019Q41742)	6,000
2018	NSERC – Alexander Graham Bell Canada Graduate Scholarship - D (CGS D) (Grant No. 11020182019Q11736)	105,000
2018	University of Manitoba Tri-Council NSERC Top-Up Award	5,000
2018	University of Manitoba Fellowship for Educational Purposes	2,500
2017	Research Manitoba Graduate Scholarship	17,500
2017	Manitoba Graduate Fellowship	15,000
2017	University of Manitoba Graduate Fellowship	14,000
2017	WCUMSS Bamfield Graduate Student Award	1,500
2016	WCUMSS Bamfield Graduate Student Award	1,500
2012	Environment Canada’s Science Horizons Youth Internship Grant (Grant No. S&T 335)	12,000
2012	Alex Graham Memorial Award, Dalhousie University	333
2009	John L. and Karen C. Pye Memorial Scholarship, Dalhousie University	5,000
2007	Alexander Rutherford Scholarship, Government of Alberta	2,500



TRAVEL AWARDS & FUNDING – \$7,200

2022	ICBF AFS-Physiology Division travel award	650
2022	University of Graduate Studies Association travel award	1,000
2022	University of Manitoba Faculty of Biological Sciences Travel award	500
2022	University of Manitoba Faculty of Science Travel award	500
2022	University of Manitoba Graduate Students Association Travel award	250
2019	University of Manitoba Graduate Studies Association travel award	750
2019	University of Manitoba Faculty of Graduate Studies travel award	1000
2019	Society for Experimental Biology travel award	650
2019	University of Manitoba Biological Sciences travel award	250
2019	University of Manitoba Faculty of Science travel award	250
2018	ICBF AFS-Physiology Division travel award	900
2018	University of Manitoba Faculty of Science travel award	500



TEACHING – University of Manitoba

Summer
2023

Biol 1412: Physiology of the Human Body
Biological Laboratory Instructor

- Led and managed a team of 3 teaching assistants and 1 laboratory technician
- Provided direction and guidance to team members to ensure the smooth execution of tasks and responsibilities
- Facilitated regular team meetings to discuss progress, address challenges, and brainstorm solutions to the better present and deliver the teaching material and laboratory exercises to the students
- Developed and prepared instructional and teaching materials for in-person laboratories for 225 undergraduate students
- Designed and prepared materials for assignments, quizzes, and exams
- Facilitated the administration of examinations, including logistical issues, and preparing the completed exam sheets for grading through electronic bubblesheets with IT Services
- Through UM Learn (D2L/Blackboard) I created, implemented, and maintained a weekly schedule for the students, intelligent agent reminders, pre-reading quizzes, online assignment submissions and grading, and the dispersal of grades pertaining to quizzed and assignments
- Maintained open and consistent communication with 225 first-year undergraduate students through in-person interactions and email



TEACHING ASSISTANT – University of Manitoba

Fall 2022

Biol 1020: Biology 1. Principles and Themes

- Taught 3 section of 32 students
- Taught laboratory course material and experiments, and graded assignments

Summer
2022

Biol 1020: Biology 1. Principles and Themes

- Taught 1 section of 25 students
- Taught laboratory course material and experiments, and graded assignments

Biol 1030: Biology 2. Biological Diversity, Function, and Interactions

- Taught 1 section of 25 students
- Taught laboratory course material and experiments, and graded assignments

Biol 2300: Principles of Ecology

- Taught 2 sections of 20 students each
- Monitored in-laboratory exercises and graded assignments

Winter
2022

Biol 1030: Biology 2. Biological Diversity, Function, and Interactions

- Taught 4 sections of 35 students each
- Taught laboratory course material and experiments, and graded assignments

Biol 2210: The Chordates

- Taught 1 section of 20 students
- Graded year end essays

Fall 2021

Biol 3350: Data Analysis in Ecology

- Taught 1 section of 20 students
- Graded statistical assignments



Volunteer Research

- 2014 Dalhousie University, Halifax, Nova Scotia, Canada
Research Assistant – Dr. Hal Whitehead’s Cetacean Lab
- Two weeks aboard a 40 ft sailboat, *Balaena*, sailing around the Galápagos Islands
 - Tracked and monitored sperm whales (*Physeter macrocephalus*) visually and acoustically with a hydrophone
 - Captured photographs for identification and matching of individuals within the Whitehead Sperm Whale Catalogue
- 2011 Dalhousie University, Halifax, Nova Scotia, Canada
Research Assistant – Dr. Hal Whitehead’s Cetacean Lab
- Three weeks aboard a 40ft sailboat *Balaena* sailing around the Gully Marine Protected Area (MPA) near Sable Island, Nova Scotia
 - Tracked and monitored Northern bottlenose whales (*Hyperoodon ampullatus*) visually and acoustically with a hydrophone; photographed individuals for identification
- 2009 – 2012 Bedford Institute of Oceanography, Fisheries and Ocean Canada
Volunteer – Canada Shark Research Laboratory
- Utilized annual shark tournaments throughout Nova Scotia to track feeding behaviours and population demographics of blue sharks (*Prionace glauca*)
 - Weighed, measured and dissected blue and mako sharks
 - Removed and investigated shark gut contents for analysis
 - Educated the public on the biological, ecological, and sociological aspects of sharks
- 2009 Dalhousie University, Halifax, Nova Scotia, Canada
Research Assistant – Dr. T. Romunak Food-web Analysis Lab
- Sorted, identified, and sized various species of invertebrates including copepods, daphnia, ostracods, and worms.
 - Gathered samples of various invertebrates from tidal pools in Bermuda and transported them back to Canada



Committee Service

- 2019 – 2023 University of Manitoba, Winnipeg, Manitoba, Canada
Animal Care Committee
- Reviewed and approved animal-use protocols and standard operating procedures (SOPs) on a monthly basis for researchers at the University of Manitoba Fort Garry campus, the Glenlea Research Station, and the IISD Experimental Lakes Area
 - Animal-use protocols were for both laboratory-based research with captured or lab raised animals, and field-based research with wildlife. Animals included domestic and wild animals: fish, sharks, cows, birds, pigs, amphibians, reptiles, and rodents
 - Collaborated with on-site staff and campus Veterinarians to conduct yearly site visits and inspections of the animal and research facilities operated and overseen by the University of Manitoba. Assisted in the reporting and development of corrective actions to identify deficiencies and enhance facility safety and operations
- 2021 University of Manitoba, Winnipeg, Manitoba, Canada
Faculty of Graduate Studies Executive NSERC Awards Committee
- Served as a member of the selection committee responsible for awarding NSERC scholarships to Master students attending the University of Manitoba
 - Analyzed and evaluated 68 scholarship applications from students in all Science Faculties (Biology, Chemistry, Earth Sciences, Engineering, Health Sciences, Kinesiology, Microbiology, Psychology)
 - Awarded NSERC CGS-M Master’s scholarships for the University of Manitoba to 20 recipients, based on academic excellence, research potential, and personal characteristics and skills, including service and volunteer experience

- 2018 - 2019 | University of Manitoba, Winnipeg, Manitoba, Canada
Prairie Undergrad Biology Symposium (PUBS) – Co-chair Local Organizing Committee
- Co-lead a team of nine graduate students to organize and execute the annual meeting of PUBS, a symposium attended by 70 graduate and undergraduate students from Universities across the Canadian Prairies
 - Collaborated with team members to develop and manage the symposium’s schedule and logistics
 - Managed budgetary considerations, securing funding and overseeing expenditures
- 2017 - 2018 | University of Manitoba, Winnipeg, Manitoba, Canada
Department of Biological Sciences – Graduate Student Representative
- Attended monthly meetings with faculty members of the Biological Sciences Department to represent graduate students within the department
- 2017 - 2018 | University of Manitoba, Winnipeg, Manitoba, Canada
Biological Sciences Graduate Student Association – President
- Lead a team of ten graduate students to organize events, lectures, fundraisers, and forums for graduate students and faculty members in the Biological Sciences Department
- 2010 - 2012 | Dalhousie University, Halifax, Nova Scotia, Canada
Dalhousie Association of Marine Biology Students – Treasurer
- Oversaw the financial planning and budget of the society
 - Responsible for record keeping and financial reporting of all activities, expenses, and fundraisers
 - Aided in the planning and implementation of all society events
- 2010 - 2012 | Dalhousie University, Halifax, Nova Scotia, Canada
Dalhousie Science Society Council – Marine Biology Representative
- Attended monthly meetings with the all Presidents and Treasurers from the undergraduate student science societies within the Faculty of Science
 - Responsible for reviewing grant applications and awarding undergraduate travel funds



EMPLOYMENT

- 2022 - 2024 | University of Manitoba, Winnipeg, Canada
Biological Laboratory Technician – Biology 1: Principles and Themes
Biology 2: Biological Diversity, Function, and Interactions
- Assisted in the operation of the large enrolment first-year introductory biology laboratory courses (> 1400 students and 30 TA’s)
 - Logistical roles:
 - Set-up, dismantling, cleaning, and organization of laboratory equipment and materials for 53 learning labs per week (6 labs running simultaneously with 20-35 students per lab)
 - Preparation of chemical solutions and stains
 - Clean-up and disposal of biological materials including preserved specimens
 - Troubleshooting maintenance of laboratory equipment and audio/visual equipment in 6 learning laboratories
 - Administrative roles:
 - Organization and enrolment of students into laboratories and groups
 - Upload, administration, and organization of learning and presentation of materials to UM Learn (DSL/Blackboard) portal, as well as entering of grades
 - Preparation of presentation materials, including weekly learning powerpoint files from which the TAs instruct; preparation of learning aids, including “How to” binders with instructions for TAs and students
 - Preparation and maintenance of six new MacBook laptops used by the TAs to facilitate presentation of materials to the students
 - Work closely with the Lab Instructor to determine the best way to present material to the students and facilitate the smooth operation and distribution of learning modules and objective

- 2013 – RPS Energy Ltd. Halifax, Nova Scotia, Canada
2016
Marine Mammal Observer and Passive Acoustic Monitor
- Visual and acoustic monitoring of marine protected species during surface seismic, vertical seismic profiles, and Geohazard surveys. Surveys were conducted on offshore vessels, oil-rigs, and drilling platforms
 - Conducted passive acoustic monitoring (PAM) using a four-hydrophone towed array in the Gulf of Mexico and North Atlantic Ocean
 - Conducted vertical seismic profiles (VSP) with a single hydrophone static PAM cable in the North Atlantic Ocean
 - Extensive knowledge of North Eastern Atlantic Ocean marine mammals and sea birds
 - Responsible for daily, weekly, and end of project reports submitted to the clients, which included all of the sightings and marine animal activities during the transect surveys
- 2010 – Dr. Hal Whitehead’s Cetacean Laboratory, Dalhousie University, Nova Scotia Canada
2015
Research Assistant
- Photographic identification of marine mammals including: long-finned pilot whales, Northern bottlenose whales, and sperm whales
 - Worked with Joana Augusto, Ph.D. to match digital photographs to a catalogue of long-finned pilot whales (*Globicephala melas*) in Pleasant Bay, Cape Breton, Nova Scotia from 1998 to present
 - Worked with Mauricio Cantor, Ph.D. on sperm whales (*Physeter macrocephalus*) in the Galápagos Islands, Ecuador. Collected data during a two week sailing trip around the Galápagos Islands where we tracked and photographed sperm whales. Matched digital photographs of individual sperm whales with the Whitehead Sperm Whale Catalogue containing animals from 1989 to present
 - Worked with Manolo Torres, Ph.D. on sperm whales (*Physeter macrocephalus*) in the Sea of Cortez matching digital photographs of individual sperm whales with the Whitehead Sperm Whale Catalogue containing animals from 1989 to present
 - Worked with Kristi O’Brien, M.Sc. on Northern bottlenose whales (*Hyperoodon ampullatus*) in the Gully Marine Protected Area (MPA), Nova Scotia, Canada to match digital photographs of individual Northern bottlenose whales. Collected data during a three week sailing trip within the Gully MPA, tracking and photographing the whales
- 2012 – Grand Manan Whale and Seabird Research Station, New Brunswick, Canada
2013
Research Assistant
- Recipient of **Environment Canada’s Science Horizon’s Youth Internship Program Award** to conduct research on basking sharks (*Cetorhinus maximus*) within the lower Bay of Fundy, Canada
 - Created the Bay of Fundy Basking Shark Photo-Identification Catalogue; photographed basking shark dorsal fins to identify individual sharks within the region
 - Tagged basking sharks with CDT tags to understand their use of the Bay of Fundy
 - Conducted benthic sampling and planktonic net drags
 - Captured and tagged Greater shearwaters for secondary research project. Took blood samples and body measurements
- 2010
Freshwater Institute, Fisheries and Oceans Canada, Winnipeg, Manitoba, Canada
Research Assistant – Dr. C. Podemski Freshwater Impact Lab
- Identification of microscopic benthic freshwater invertebrates from sediment samples.
 - Preparation, preservation, and storage of benthic samples
 - Winter fieldwork at IISD Experimental Lakes Area in Ontario, Canada. Field work included: sediment core sampling; benthic invertebrate sampling; operation of gas powered augur; ammonia concentration analysis within sediment; sediment processing and packaging; and sediment faecal matter analysis

- 2009 | Bermuda Aquarium Museum and Zoo, Bermuda
Aquarium Intern
- Recipient of the **John L. and Karen C. Pye Memorial Scholarship**
 - Cleaned and maintained the 26 fish tanks that house fish endemic to Bermudian waters; spent 3 hours a day SCUBA diving in a 140,000 gallon tank for cleaning and maintenance
 - Educated guests on the many species of endemic marine fish and animals on exhibit
 - Prepared food for marine fish, seals, turtles, eels, sharks, and lobsters; implemented a feeding schedule for five resident sharks
 - Trained, fed, and provided enrichment for the five Harbour seals
 - Cared for an injured Green turtle; wound cleaning and medication administration
- 2009 | Nova Scotia Fisheries and Aquaculture, Halifax, Nova Scotia, Canada
Outreach Coordinator
- Traveled to small communities within Nova Scotia to promote local aquaculture
 - Educated the public on the local aquaculture industry, farms, and available products
 - Transported a refrigerated touch-tank for visitors to interact with local benthic aquatic life



Extracurricular Volunteer Service

- 2018, 2019 | University of Manitoba, Winnipeg, Manitoba, Canada
Science Rendezvous – Photographer
- 2017 | Canadian Society of Zoologists (CSZ)
Financial Volunteer – Annual meeting held in Winnipeg
- 2011 – 2012 | Dalhousie University, Halifax, NS
Let’s Talk Science – Outreach Volunteer
- 2004 – 2005 | Disney Cruise Line, Bahamas and Florida
Disney VoluntEars



REFERENCES

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