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Phone:248-885-5450

Email: dani.blumstein@gmail.com

Twitter: @DaniBlumstein

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EDUCATION HISTORY

# Danielle M. Blumstein

*Molecular ecology & genomics*

EUDCATION

PhD Student, Molecular and Evolutionary Systems Biology. University of New Hampshire. 2019-Present

M.S., Natural Resources. Wisconsin Cooperative Fishery Research Unit, University of Wisconsin - Stevens Point.2017-present

GPA: 3.88/4.00

B.S., Zoology. Michigan State University. 2013 – 2017. Concentration: Ecology, Evolution, and Organismal Biology Minor: Environmental Studies and Sustainability

GPA: 3.3931/4.00

PUBLICATIONS

***Blumstein, D. M.,*** Campbell, M. A., Hale, M. C., Sutherland, B. J., McKinney, G. J., Stott, W., & Larson, W. A. (2019). Comparative genomic analyses and a novel linkage map for cisco (Coregonus artedi) provides insight into chromosomal evolution and rediploidization across salmonids. *bioRxiv*, 834937.

***Blumstein DM***. (2019). The first haploid linkage map in a coregonid (Coregonus artedi) improves knowledge of chromosomal evolution and rediploidization across Salmonids. Master's thesis. University of WisconsinStevens Point.

***Blumstein DM***, Mays D, Scribner KT. (2017). Spatial genetic structure and recruitment dynamics of burbot (*Lota lota*) in Eastern Lake Michigan and Michigan tributaries. *Journal of Great Lakes Research, 44*(1):149156.

Waraniak JM, ***Blumstein DM***, Scribner KT. (2017). Barcoding PCR primers detect larval lake sturgeon (*Acipenser fulvescens*) in diets of piscine predators. *Conservation Genetics Resources*, *10*(2):259-268.

RESEARCH EXPERENCE

**2017-2019** Graduate Research Assistant. *Wisconsin Cooperative Fisheries Unit, University of Wisconsin – Stevens Point*.

“The first haploid linkage map in a coregonid (Coregonus artedi) improves knowledge of chromosomal evolution and rediploidization across Salmonids” Advisor: Dr. Wesley Larson.

Constructed a linkage map to facilitate research on the genetic basis of phenotypic diversity in coregonines in the Great Lakes.

* Collected C. artedi from known spawning locations in Lake Huron
* Use dry artificial spawning methods paired with UV-irradiation of sperm to produce newly generated haploid families
* Collected morphometric measurements from previously generated diploid families
* Extracted DNA and used a SNP based RADseq approach to genotype individuals
* Constructed a high-density integrated linkage map using haploid and diploid data annotated with QTL mapping
* Aligned the linkage map to various other genomic resources
* Conducted a cross-species comparison of homeologous regions was conducted to identify regions that still exhibit residual tetraploidy, that rediploidized and diverged prior to speciation, and that diverged since diversification

RESEARCH EXPERIENCE CONT.

**Jan-Apr 2017** International Research Experience. *Victoria University of Wellington, New Zealand.*

Developed an interdisciplinary perspective of interactions between animal health, environmental health, and human health as they apply to culture.

* Completed course work that consisted of extensive field, laboratory, and statistical courses in the studies of ecology, microbiology, molecular biology, genetics, histopathology, and bioinformatics.
* Completed field work that consisted of
* Surveys for critically endangered giant land snail (*Powelliphanta*)
* Soil sample collection
* Biodiversity assays
* Macroinvertebrate community assemblage
* Point counts
* Transect surveys
* Species identification (birds, plants, macroinvertebrates)
* Interacted with the local public and stakeholders, explained our scientific and conservation work

**2014-2017** Undergraduate Laboratory Technician. *Department of Fisheries and Wildlife Molecular Ecology Laboratory, Michigan State University*.

Conducted molecular genetics lab work and data analysis on various projects.

* Independent research on the spatial genetic structure and recruitment dynamics of Burbot (*Lota lota*)
* Developed a molecular assay to quantify the predation of larval Lake Sturgeon (*Acipenser fulvescens*) • Genetic assessment of male lake sturgeon (*Acipenser fulvescens*) reproductive success
* Assisted in lab work related to Steelhead and invasive species projects.
* Extracted DNA
* Optimized primers
* PCR
* Gel electrophoresis
* Microsatellite genotyping
* Database management
* Pedigree analysis
* Assignment to population of origin

**May-Aug 2016/** Field Technician. *MSU/MDNR Black River Sturgeon Hatchery and* **May-Aug 2017** *Research Facility, Onaway, Michigan.*

Conducted hatchery and field work for research and conservation aquaculture of lake sturgeon

* Captured adult sturgeon with large dip nets during snorkel surveys
* Extracted gametes from spawning adult sturgeon
* Implanted RFID, PIT, and floy tags
* Artificial fertilization of fish eggs
* Maintained fish health during early life stages (removal of dead individuals, prophylactic treatments)
* Fed larval fishes (brine shrimp cultures, bloodworms)
* General hatchery maintenance (disinfection, pipes and filtration systems)

RESEARCH EXPERIENCE CONT.

**July-Aug 2016** Aquatic Invasive Species Technician. *Department of Fisheries and Wildlife Molecular Ecology Laboratory, Michigan State University*

Assissted in field sampling and lab work to develop eDNA assays to detect presence of aquatic invasive species

* Traveled to ~50 rivers, inland lakes, and Great Lake sites throughout the Michigan’s lower peninsula to collect rusty crayfish (*Orconectes rusticus*), zebra mussels (*Dreissena polymorpha*), and round goby (*Neogobius melanostomus*).
* Collected 30 individuals from each species from locations chosen prior to sampling. Samples were collected using dip nets, snorkeling, beach seining, hand line fishing, and electroshocking.
* Sample cataloging
* DNA extractions and DNA quantification • RADseq.
* Map creation using ArcGIS.

**May-Dec 2015** Field Technician. *Michigan State University Department of Plant Biology Schemske Laboratory, Mammoth Cave National Park, Kentucky.*

Field sampling and greenhouse rearing of plants for research on the latitudinal biodiversity gradient

* Independently collected and analyzed field data
* Population location
* Species identification (*Ruellia*, *Cuphea*, *Desmodium*, and *Phytolacca*)
* Pollinator observations, pollinator/herbivore collection, herbivory rate measurements, insect pinning and identification, and caterpillar rearing
* Autogamy treatments, seed collections, leaf and flower marking, floral and leaf trait measurements • Sowing seeds
* Transplanting large populations of plants
* Seed counting
* Leaf drying
* Plant care (watering, fertilization, etc.)

**2013-2016** Student Intern*. RISE Bailey Greenhouse and Urban Farm, Michigan State University.*

Work in an urban greenhouse to grow organic produce and crop plan for urban farming research

* Daily greenhouse duties consisted of harvest, bed preparation, watering, soil testing, composting, and maintenance work to produce certified USDA organic vegetables and herbs.
* Participated in Urban Farming Research including “green roof” gardening, vermicomposting, hot composting, urban beekeeping, season extension, and passive solar greenhouse technology.
* Provided informational seminars and tours of Bailey Greenhouse and Urban Farm and Student Organic Farm to public and private groups

PRESENTATIONS

***Blumstein DM***. (2019). The first haploid linkage map in a coregonid (*Coregonus artedi*) improves knowledge of chromosomal evolution and rediploidization across Salmonids. International Association for Great Lakes Research 62nd Annual Conference on Great Lakes Research. The College at Brockport, State University of

New York

***Blumstein DM***. (2019). The first haploid linkage map in a coregonid (*Coregonus artedi*) improves knowledge of chromosomal evolution and rediploidization across Salmonids. Master's thesis. University of Wisconsin Stevens Point.

PRESENTATIONS CONT.

***Blumstein DM***, Stott W, Larson WA (2019) Development of a genetic linkage map for cisco (*Coregonus artedi*) to facilitate integrated studies of adaptive diversity (poster). 47th Annual Meeting of the Wisconsin Chapter of the American Fisheries Society. Green Bay, Wisconsin.

***Blumstein DM***, Stott W, Larson WA (2018) Development of a genetic linkage map for cisco (*Coregonus artedi*) to facilitate integrated studies of adaptive diversity. University of Wisconsin – Stevens Point StudentSub Unit of American Fisheries Society. *Invited Seminar*.

***Blumstein DM***, Stott W, Larson WA (2018) Development of a genetic linkage map for cisco (*Coregonus artedi*) to facilitate integrated studies of adaptive diversity. USGS Great Lakes Science Center, Ann Arbor, Michigan. *Invited Seminar*.

***Blumstein DM***, Stott W, Larson WA (2018) Development of a genetic linkage map for cisco (*Coregonus artedi*) to facilitate integrated studies of adaptive diversity (poster). Midwest Fish and Wildlife Conference. Milwaukee, Wisconsin.

***Blumstein DM***, Mays D, Scribner KT (2017) Spatial genetic structure and recruitment dynamics of burbot (*Lota lota*) in Eastern Lake Michigan and Michigan tributaries. USGS Great Lakes Science Center, Ann Arbor, Michigan. *Invited Seminar*.

***Blumstein DB***, Waraniak JM, Scribner KT (2016) Barcoding PCR primers detect larval lake sturgeon (*Acipenser fulvescens*) in diets of piscine predators (poster). University Undergraduate Research and Arts Forum, Michigan State University.

***Blumstein DB***, Scribner KT (2015) Genetic assessment of the male reproductive success of lake sturgeon (*Acipenser fulvescens*) as a function of duration of river occupancy during the spawning season (poster). University Undergraduate Research and Arts Forum, Michigan State University.

AWARDS

2018 Muskie Clubs Alliance of Wisconsin Inc. Scholarship, University of Wisconsin – Stevens Point.

2018 OSCAR Travel Grant, University of Wisconsin – Stevens Point.

2017 Undergraduate Long-Term Study Abroad Program Scholarship, College of Natural Science, Michigan State University.

2016 Undergraduate Research Support Program Scholarship, College of Natural Science, Michigan State University.

2015 The Rajendra Essay Award, Department of Fisheries and Wildlife, Michigan State University.

2014 RISE Emerging Leaders Scholarship, College of Natural Resources, Michigan State University.

2014 Donald F. Koch and Barbara J. Sawyer-Koch Environmental Studies Scholarship, College of Natural Resources, Michigan State University.

SKILLS

*Genetics Lab Work:*

* 96 well Qiagen/Promega DNA extraction

(tissue)

* Qiagen single tube DNA extraction (tissue, diet samples, eDNA, insects)
* Agarose and polyacrylamide gel electrophoresis
* qPCR
* PCR optimization & clean up
* Microsatellite genotyping
* DNA quantification (nanodrop and PicoGreen)
* Plate prep for ABI 3730
* RAD library preparation and data management TOPO cloning with Blue-White Selection

*Computer Skills:*

* Programs: STACKS, Rqtl, ArcMap, LepMap
* R statistical software
* High performance computing with slurm scheduling
* Microsoft Office (Word, Excel, Powerpoint)
* Image J
* Colony Parentage Analysis Program
* Adobe Photoshop
* Coding languages: Java, Python

*Fisheries Field Work:*

* Morphometric measurements
* Barge and backpack electrofishing
* Kick net, seine net, drift net, fyke net, trap net, and gill net sampling
* Implantation of RFID, PIT, and floy tags
* Tissue sample collection for genetic analyses
* Fish care and fish feeding, fish disease prevention, identification, and treatment

*Other Skills:*

* Extensive backcountry camping experience
* Snorkeling
* Graphic design
* Knot tying
* Driving 4WD vehicles, including manual transmission

COURSEWORK

Graduate (University of New Hampshire\_

GEN 812: Programming for Bioinformatics

MCBS 913: Applied Bioinformatics

NR 995: Landscape Genetics

Graduate (University of Wisconsin – Stevens Point)

CNMT 110: Object-Oriented Programming

DS 700: Data Science

GEOG 641: GIS Programming and Customization

NRES 605: R Programming

NRES 775: Topics in Conservation Genetics

NRES 796: Conservation Biology and Modeling

NRES 797: Research Methods Design & Analysis

WATR 584: Life History of Fishes

WLDL 742: Ecological Data Analysis

Undergraduate (Michigan State University)

FW 101/101L: Fundamentals of Fish and

Wildlife

FW 419: Application of GIS in Natural Resources

IBIO 341: Fundamental Genetics

IBIO 445: Evolution

IBIO 492: Interdisciplinary Study Conservation Medicine

IBIO 492L: Advance Research Applied Conservation Medicine

IBIO 493: International Communication Conservation Medicine

MC 391: Selected Topics in Public AffairsEnvironmental Policy

NSC 192: Environmental Issues Seminar

NSC 292: Application of Environmental Studies

PLB 418: Plant Systematics

ZOL 355/355L: Ecology

ZOL 489: Seminar in Zoo and Aquarium Science

REFRENCES

Dr. Matthew MacManes

matthew.macmanes@unh.edu

Professor, University of New Hampshire

Dr. Wesley Larson

wes.larson@uwsp.edu

Professor, University of Wisconsin- Stevens Point

Dr. Wendylee Stott

wstott@usgs.gov

Research Fisheries Biologist, USGS Great Lakes Science Center

Dr. Garrett McKinney

garrett.mckinney@noaa.gov

NOAA, National Marine Fisheries Service