Nicholas J. Marra
F1306, 1 University Parkway, University Park, IL 60484-0975
708-235-2247, nmarra@govst.edu
www.linkedin.com/in/nicholas-marra

EDUCATION:

Ph.D., Purdue University	Molecular Evolutionary Genetics	December 2013
B.S., Hope College	Biology, Chemistry Minor	May 2008

PROFESSIONAL EXPERIENCE:

Assistant Professor, Division of Science, Mathematics, and Technology, Governors State University	2021-Present
Assistant Professor, Biology, Drury University	2018-2021
Postdoc, Population Medicine & Diagnostic Sciences, Cornell University	2014-2018
Postdoc, Forestry & Natural Resources, Purdue University	2014-2014
Graduate Research Assistant, Forestry & Natural Resources, Purdue University	2008-2013
Researcher, Biology, Hope College	2005-2008

PUBLICATIONS:

*Undergraduate author at time of project **Author is a high school educator

19. Stanhope M.J., Ceres, K.M., Sun Q., Wang M., Zehr J.D., **Marra N.J.**, Wilder A.P., Bernard A.M., Pavinski-Bitar P., Lokey M.G., Shivji M.S. (2023) Genomes of endangered great hammerhead and shortfin mako sharks reveal historic population declines and high levels of inbreeding in great hammerhead. **iScience,** 26(1).

18. Harder A.M., Walden K.K.O., **Marra N.J.**, Willoughby J.R., (2022) High-quality reference genome for an arid-adapted mammal, the banner-tailed kangaroo rat (*Dipodomys spectabilis*). **Genome Biology and Evolution,** 14(1).

17. **Marra N.J.,** Stanhope M.J., Jue N.K., Richards V.P., O'Brien S.J., Antunes A., Shivji M.S. (2021) Commentary: Unbiasing genome-based analyses of selection: An example using iconic shark species. **Frontiers in Marine Science,** 8.

16. Needle D.B., Gibson R., Hollingshead N.A., Sidor I.F., **Marra N.J.**, Rothenheber D., Thachil A.J., Stanhope B.J.*, Stevens B.A., Ellis J.C., Spanswick S., Murray M., Goodman L.B. (2019) Atypical Dermatophytosis in 12 North American Porcupines (*Erethizon dorsatum*) from the Northeastern United States 2010–2017. **Pathogens**, 8(4), 171.

15. Gorman J.*, **Marra N.J.**, Shivji M.S., Stanhope M.J. (2019) The complete mitochondrial genome of an Atlantic Ocean Shortfin Mako Shark, *Isurus oxyrinchus*. **Mitochondrial DNA Part B: Resources**, 4(2), 3642-3643.

14. **Marra N.J.,** Stanhope M.J., Jue N.K., Wang M., Sun Q., Pavinski-Bitar P., Richards V.P., Komissarov A., Rayko M., Kliver S., Stanhope B.J.*, Winkler C., O'Brien S.J., Antunes A., Jorgensen S., Shivji M.S. (2019) White shark genome reveals ancient elasmobranch adaptations associated with wound healing and the maintenance of genome stability. **Proceedings of the National Academy of Sciences,** 116(10): 4446-4455.

13. Ruck C.L., **Marra N.J.**, Shivji M.S., Stanhope M.J. (2017) The complete mitochondrial genome of the endangered great hammerhead shark, *Sphyrna mokarran*. **Mitochondrial DNA Part B: Resources,** 2(1):246-248.

12. Willoughby J.R., Sundaram M., Wijayawardena B.K., Lamb M.C.*, Kimble S.J.A., Ji Y., Fernandez N.B.*, Antonides J.D., **Marra N.J.**, DeWoody J.A. (2017) Biome and migratory behavior significantly influence vertebrate genetic diversity. **Biological Journal of the Linean Society,** 121(2):446-457.

11. **Marra N.J.**, Richards V.P., Early A., Bogdanowicz S., Pavinski Bitar P.D., Stanhope M.J., Shivji M.S. (2017) Comparative transcriptomics of elasmobranchs and teleosts highlight important processes in adaptive immunity and regional endothermy. **BMC Genomics,** 18:87.

10. **Marra N.J.,** Wang M., Sun Q., Pavinski Bitar P.D., Stanhope M.J., Shivji M.S. (2016) Mitochondrial genome of an Atlantic white shark (*Carcharodon carcharias*). **Mitochondrial DNA Part B: Resources,** 1:717-719.

9. Lutz H.L., **Marra N.J.,** Grewe F., Carlson J.S., Palinauskas V., Valkiūnas G., & Stanhope M.J. (2016) Laser capture microdissection microscopy and genome sequencing of the avian malaria parasite, *Plasmodium relictum*. **Parisitology Research,** 115:4503-4510.

8. Ji Y., **Marra N.J.**, DeWoody J.A. (2015) Comparative analysis of active retrotransposons in the transcriptomes of three species of heteromyid rodents. **Gene**, 562:95-106.

7. Willoughby J.R., Sundaram M., Wijayawardena B.K., Kimble S.J.A., Ji Y., Fernandez N.B.*, Antonides J.D., Lamb M.C.*, **Marra N.J.**, DeWoody J.A. (2015) The reduction of genetic diversity in threatened vertebrates and new recommendations regarding IUCN conservation rankings. **Biological Conservation**, 191:495-503.

6. **Marra N.J.**, DeWoody J.A. (2014) Transcriptomic characterization of the immunogenetic repertoires of heteromyid rodents. **BMC Genomics**, 15:929.

5. **Marra N.J.**, Romero A., DeWoody J.A. (2014) Natural selection and the genetic basis of osmoregulation in Heteromyid rodents as revealed by RNA-seq. **Molecular Ecology,** 23:2699-2711.

4. DeWoody J.A., Abts K.C., Fahey A.L., Ji Y., Kimble S.J., **Marra N.J.**, Wijayawardena B.K., Willoughby J.R. (2013) Of contigs and quagmires: next-generation sequencing pitfalls associated with transcriptomic studies. **Molecular Ecology Resources,** 13:551–558.

3. Doyle J.M., Siegmund G.*, Ruhl J.D. **, Eo S.H., Hale M.C., **Marra N.J.**, Waser P.M., DeWoody J.A. (2013) Microsatellite analyses across three diverse vertebrate transcriptomes (*Acipenser fulvescens*, *Ambystoma tigrinum*, and *Dipodomys spectabilis*). **Genome,** 56:407-414.

2. Eo S.H., Doyle J.M., Hale M.C., **Marra N.J.**, Ruhl J.D.**, DeWoody J.A. (2012) Comparative transcriptomics and gene expression in larval tiger salamander (*Ambystoma tigrinum*) gill and lung tissues as revealed by pyrosequencing. **Gene,** 492:329-338.

1. **Marra N.J.,** Eo S.H., Hale M.C., Waser P.M., DeWoody J.A. (2012) *A priori* and *a posteriori* approaches for finding genes of evolutionary interest in non-model species: osmoregulatory genes in the kidney transcriptome of the desert rodent *Dipodomys spectabilis* (banner-tailed kangaroo rat). **Comparative Biochemistry and Physiology Part D,** 7:328–339.

GRANTS:

NSF Doctoral Dissertation Improvement Grant, 2011, *Dissertation Research: Expression and Evolution of Genes Underlying Water Retention in Heteromyid Rodents from Xeric and Mesic Environments*	$15,000
Purdue University, grant supporting Science in Schools program, 2011, 2012, 2013	$3,000
Purdue University Life Sciences (PULSe) Travel Grant, 2010, 2011, 2012, 2013	$1,300
Graduate School Fellowship Incentive Grant, 2008 & 2009	$750

HONORS AND AWARDS:

Profiled for publication & shark conservation genomics ArtSci (CAS newsletter, GSU)	Spr. 2023
Profiled as a new faculty member by ArtSci (CAS newsletter, GSU)	Spr. 2022
Reviewer of the Month (for review in summer 2020, *Communications Biology*)	Jan. 2021
Kirkpatrick Memorial Outstanding Graduate Student Award (Purdue)	2013
Lynn Fellowship (Purdue)	2008
Graduated *summa cum laude* (Hope)	2008
Undergraduate research award, the Hope College chapter Sigma Xi	2008
Patterson Memorial Prize in Biology (Hope)	2008
Tri-Beta, National Biology Honor Society (Hope)	2007
Presidential Scholarship (Hope)	2004
Eagle Scout, Boy Scouts of America	2004

STUDENT GRANTS & AWARDS (*presented to my advisees*):

Beta Beta Beta Research Grant, 2020 (*Luke Wegenka*)	$722
Drury Fusion Grant (Drury), 2020 (*Chase Beeler*)	$1,224
Research Experience in the Natural Sciences (Drury), 2020 (*Chase Beeler*)	$2,500
Research Experience in the Natural Sciences (Drury), 2020 (*Joel Bilyeu*)	$2,500
Research Experience in the Natural Sciences (Drury), 2019 (*Luke Wegenka*)	$2,500
Judge Warren White Scholar (Drury), 2019 (*Joel Bilyeu*)	

TEACHING EXPERIENCE:

Instructor, BIOL 4992: Undergraduate Research II (GSU) Spring 2023-

- Upper division course where students implement research project that was proposed in Biol 4990 (6 students)

Instructor, BIOL 4990: Undergraduate Research I (GSU) Fall 2022-

- Upper division courses where students learn about the proposal writing process, discuss literature and ethics of research, and prepare a research proposal for completion in the following semester (9 students)

Instructor, BIOL 4450/4451: Animal Physiology and Lab (GSU) Fall 2023-

- Upper division course where students learn about major physiological systems from a human and vertebrate perspective (~10 students)

Instructor, CHEM 4335/5035: Intro to Bioinformatics (GSU) Summer 2022-

- Upper division and graduate course introducing bioinformatics as a discipline, applications of it, and introductory coding as a 5 week workshop (5 students)

Instructor, BIOL 3340/3341: Genetics & lab (GSU) Spring 2022-

- 2nd and 3rd year course exploring classical & molecular genetics (~20 students)

Instructor, BIOL 3099: Biology Junior Seminar (GSU) Spring 2022-

- 3rd year course where students conduct career planning and research design (~20 students)

Instructor, BIOL 1500/1501: General Biology 1 & lab (GSU) Fall 2021-

- First semester 1st year course exploring the molecular biology, the function of macromolecules, DNA and inheritance, & evolution (~25 students per section, 15 per lab)

Instructor, BIOL 6700/6701: Conservation Genetics & lab (GSU) Fall 2021-

- Graduate level course exploring the current extinction crisis and the application of molecular techniques to evaluate status and evolutionary potential of threatened species

Instructor, BIOL 7110: Graduate Seminar (GSU) Fall 2021-

- Graduate level course where students practiced public speaking and presentation of their research findings as well as how to lead discussions of scientific literature

Instructor, BIOL 172: Exploring Molecular Biology (Drury) Fall 2018-2020

- First semester 1st year course exploring chemistry and biology of the cell taught multiple sections per semester (~24 students per section)

Instructor, BIOL 351: Junior Seminar I: Career Preparation (Drury) Fall 2019-2020

- Instructed students in composing a statement of purpose and resume, as well as how to find information and present about their desired career path (~20 students per section)

Instructor, BIOL 494: Senior Seminar II: Senior Capstone Presentation (Drury) Fall 2019-2020

- Guided students in crafting conference formatted abstracts as well as preparation of presentations of senior capstone projects (~7-10 students per section)

Co-instructor, FUSE 102: Writing & Talking Science in the Public Eye (Drury) Spring 2020
- Interdisciplinary course to help students gain experience writing and communicating in multiple styles and different forums (~30 students)

Instructor, BIOL 320: Vertebrate Physiology (Drury) Spring 2019 & Spring 2020
- Upper-level lecture/lab comparative study of physiological systems (~12 students per year)

Instructor, BIOL 352: Junior Seminar II: Grant Writing (Drury) Fall 2018 & Spring 2020
- Course on how to compose grant proposals and the types of science funding (~12 students)

Instructor, BIOL 160: Exploration & Discovery in Biology (Drury) Fall 2019
- Online non-majors course designed for students to learn about science and what is/what is not scientific discourse (~18 students)

Instructor, BIOL 181: Mechanisms of Genetic Inheritance (Drury) Spring 2019
- Second semester 1st year course exploring classical and molecular genetics (~24 students)

Guest Lecturer, VTPMD 6250**:** Evolutionary Genomics of Bacteria (Cornell) Spring 2017
- Gave several lectures on mechanisms for adaptation and genome evolution (~10 students)

Co-instructor, FNR 305: Conservation Genetics (Purdue) Spring 2012 & Spring 2013
- Large lecture course for upper class undergraduates that covered basic genetics and conservation biology (~70 students per semester)

Teaching Assistant, AGRY 321: Genetics Laboratory (Purdue) Spring 2010
- Taught a short lecture before overseeing the three-hour laboratory session; graded homework, lab reports, and exams (12 students in each of two separate sections)

Teaching Assistant, BIOL 280: Ecology and Evolution (Hope) Fall 2007
- Helped students with both parametric and non-parametric statistical analyses, answered questions during lab sessions, and organized supplies for the lab session (~24 students)

Teaching Assistant, BIOL 240: Cells and Genetics (Hope) Fall 2006 & Fall 2007
- Clarified concepts presented in the lab material, answered procedural and analysis questions, and provided supplies for students (~24 students)

SEMINARS *Indicates invited external seminar

Marra N.J. From the desert to the sea: Repurposing sequence data to answer new questions in non-model organisms. August 29, 2023. University of Illinois Chicago*

Marra N.J. Krats to Jaws: Applying Transcriptomics and Genomics to Understand Adaptation, Evolution, and Population History in Non-model Vertebrates. March 3, 2022. Governors State University.

Marra N.J. From the desert to the sea: Using genetics and bioinformatics to understand physiological adaptations in kangaroo rats and sharks. December 8, 2017. Drury University.*

Marra N.J. RNA and genome sequencing in sharks yield insights about genome size, immunity, and sensory biology. March 29, 2017. Biology department seminar, Vassar College.*

Marra N.J. Understanding immunity and osmoregulation in Heteromyid rodents through insights gained from RNA-seq. September 19, 2013. Biology department seminar, Earlham College.*

Marra N.J. Genetics: Its basic utility and applications to wildlife management. April 3, 2013. Bi-weekly Meeting of Purdue Student Chapter of The Wildlife Society, Purdue University.

ORAL PRESENTATIONS *Indicates undergraduate student:

*Wegenka, L., **Marra N.J.** "What drives longevity? Quantifying telomere length in long-lived cartilaginous fishes."

- Drury Research Experience in the Natural Sciences Symposium September 2019

Marra N.J., Stanhope M.J., Jue N.K., Wang M., Sun Q., Pavinski-Bitar P., Richards V.P., Komissarov A., Rayko M., Kliver S., Stanhope B.J.*, Winkler C., O'Brien S.J., Antunes A., Jorgensen S., Shivji M.S. "Evaluating positive selection and gene content in the white shark genome: insights about genome stability and patterns of sensory gene content in cartilaginous fishes."

- Annual meeting of the Society for the Study of Evolution June 2019

Marra N.J., Wang M., Pavinski Bitar P.D., Sun Q., Komissarov A., Jorgensen S., Jue N., O'Brien S.J., Shivji M., Stanhope M.J. "The genome of the white shark, *Carcharodon carcharias*: Insights on genome size evolution, repeat content, and shark biology."

- 2017 Global Biodiversity Genomics Conference February 2017

Marra N.J., Wang M., Pavinski Bitar P.D., Sun Q., Komissarov A., O'Brien S.J., Stanhope M.J., Shivji M. "Comparative genomics and transcriptomics of elasmobranchs: Insights into a primitive adaptive immune system."

- 2016 Joint Meeting of Ichthyologists and Herpetologists July 2016

Marra N.J., Wang M., Pavinski Bitar P.D., Sun Q., Komissarov A., O'Brien S.J., Shivji M., Stanhope M.J. "Bringing sharks into the genomic age: Insights from genome and transcriptome sequencing in elasmobranchs."

- Society for the Study of Evolution Annual Meeting June 2016

Marra N.J., Wang M., Pavinski Bitar P.D., Sun Q., Komissarov A., O'Brien S.J., Stanhope M.J., Shivji M. "Genome sequence of an apex predator, the white shark (*Carcharodon carcharias*)."

- 2015 Joint Meeting of Ichthyologists and Herpetologists July 2015

Marra N.J., DeWoody J.A. "RNA-seq reveals strong evidence of positive selection and gene expression differences over 20 million years of evolution in Heteromyid rodents."

- Annual meeting of the Society for the Study of Evolution June 2014

Marra N.J., Waser P.M., DeWoody J.A. "Sequence evolution and gene expression underlying osmoregulation in Heteromyid rodents."

- Annual meeting of the Society for the Study of Evolution June 2013

Marra N.J., Romero A., Waser P.M., DeWoody J.A. "RNA-seq in Heteromyid rodents: Studying how kangaroo rats live in the desert without drinking water."

- EcoLunch: Seminar series for the Purdue University EEB cluster October 2012

Marra N.J., Romero A., Waser P.M., DeWoody J.A. "Insights to the immunity and osmoregulation of Heteromyid rodents from RNA-seq."

- 1st Joint Congress on Evolutionary Biology July 2012

Marra N.J., Romero A., Waser P.M., DeWoody J.A. "Pyrosequencing of the kidney transcriptome in Heteromyid rodents to identify genes underlying osmoregulation."

- Annual meeting of the Society for the Study of Evolution June 2011

Marra N.J., Waser P.M., DeWoody J.A. "Transcriptome pyrosequencing for the identification and study of genes underlying osmoregulation and immunity in banner-tailed kangaroo rats."

- Annual meeting of the Society for the Study of Evolution June 2010

Marra N.J., Waser P.M., DeWoody J.A. "Transcriptome pyrosequencing for the identification and study of genes underlying osmoregulation in banner-tailed kangaroo rats."

- Annual meeting of the American Society of Mammalogists June 2010

Marra N.J., Bultman T., Sullivan T.J. **"**Effects of nitrogen on the mutualism between fungi and fescues."

- Hope College Biology Seminar September 2007

POSTER PRESENTATIONS:

Harder A.M., Walden K.K.O., **Marra N.J.**, Willoughby J.R., "Whole genome sequencing yields insights on current genetic diversity and historical population size in non-model species of conservation concern."

- IRACDA Retreat at Governors State University (prepared by N.J. Marra) August 2022

Marra N.J., Wang M., Pavinski Bitar P.D., Sun Q., Komissarov A., O'Brien S.J., Stanhope M.J., Shivji M. "Genome sequence of the white shark, *Carcharodon carcharias*: Insights into genome size evolution, life history characters, and a primitive adaptive immune system."

- Plant & Animal Genome Conference XXIV January 2016
- Annual meeting of the Society for the Study of Evolution June 2016
- 2016 Joint Meeting of Ichthyologists and Herpetologists July 2016

Marra N.J., Waser P.M., DeWoody J.A. "Transcriptome pyrosequencing for the identification and study of genes underlying osmoregulation in banner-tailed kangaroo rats."

- Annual Ecological Genomics Symposium November 2010

Marra N.J., Bultman T., Sullivan T.J. "Nutrient-modulated defensive mutualism: Herbivore resistance in two endophyte-infected grasses."

- Ecological Society of America Annual Meeting August 2008

Marra N.J., Bultman T., Sullivan T.J. "Effects of nitrogen on the mutualism between fungi and fescues."

- Hope Undergraduate Research Conference March 2008

Marra N.J., Gonthier D., VanArendonk S., Swarthout D., Bultman T. "Effects of aphid feeding and fungal endophyte infection on gas exchange of *Lolium arundinaceum*."

- Hope College Research Symposium January 2007
- PEW Undergraduate Research Conference October 2006

SERVICE AND OUTREACH ACTIVITIES:

Reviewer for *Animals, Ecology and Evolution, Genome Biology and Evolution, Communications Biology, Genetica, Journal of Heredity, Journal of Mammalogy, Marine Genomics, Molecular Ecology, Molecular Ecology Resources, PeerJ, Scientific Data*

South Metropolitan Higher Education Consortium: Fall 2023-present
Sustainability Initiatives Committee

- Participant for in person and remote meetings

Judge for Illinois Louis Stokes Alliance for Minority Participation meeting February 25, 2023 & February 23, 2024

- Judge for student presentations at Illinois LSAMP Symposium

Biology Major Panel for IAI (Illinois Articulation Initiative) (GSU) Summer 2022-Present

- GSU representative for state panel approving syllabi and courses that meet the standards to be included in this articulation agreement

GSU Global Affairs Committee (GSU) Spring 2022-Present

- Member of University committee that solicits, reviews, and approves service and study abroad programs led by GSU faculty for GSU students

Division Criteria Revision Committee (GSU) Spring 2022-Present

- Participated in and approved revision of the review criteria for Division of Science, Mathematics, and Technology (had not been revised since 2013-2014)

Faculty mentor for Environmental Activities Club (GSU) Fall 2021-Present

- Currently serving as the faculty mentor for this club at Governors State University which was restarted in Fall 2021 and is conducting service activities to help raise environmental awareness and stewardship

Search Committee for Assistant Professor of Biology Education (GSU) Fall 2021-Present

- Currently serving on a search committee for a new faculty member in the Division of Science, Mathematics, and Technology at Governors State University with a particular emphasis in Biology Education, successive searches in 2021-2022 and 2022-2023

Search Committee for Assistant Professor in Biology (Drury) Fall 2020-Spring 2021

- Served on successful search committee for a new faculty member in Biology with an emphasis in Exercise Physiology while on the faculty at Drury University

Faculty Advising Fellows (Drury) Fall 2020-Spring 2021

- Committee collaborates to develop tools and resources for student advising, especially for improving joint academic and career advising.
- Organized a series of taped faculty discussions about their journeys and advice to students on identifying a career path or planning for graduate school

Advisor for 2020 Missouri Conservation Student Leadership Workshop (Drury) Fall 2020

- Served as advisor for students from Drury University attending this virtual conference on conservation issues in Missouri

Science in Schools Partnerships Committee, Chair Fall 2009-Spring 2013

- Participated in Science in Schools Program and was in charge of organizing an exhibit at Spring Fest, an annual two-day outreach event sponsored by the Purdue College of Agriculture, where children and parents visit various educational exhibits

PULSe Graduate Student Organization (GSO), Vice President Fall 2010-Spring 2011

- Organized general meetings for the PULSe graduate student body

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SUPPLEMENTAL COURSES AND TRAINING:

GSU4U Ambassadors workshop November 17, 2022

- Attended workshop to learn about resources in the community and how to help students in need at GSU and how to become a GSU4U ambassador

Conservation Leaders for Tomorrow (CLFT) Workshop February 24-27, 2011

- Nominated to attend this workshop for students in natural resources. The workshop focused on conservation education and hunter awareness with an emphasis on the relationship between hunters and wildlife management

GET SET Teaching conference, Cornell University October 18, 2014

- Attended conference for graduate students and Post-docs that consisted of workshops on teaching techniques, teaching philosophy, and student communication

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MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Society for the Study of Evolution	2009-Present
American Elasmobranch Society	2016-Present
American Society of Mammalogists	2009-2013