Nathan Steadman Upham

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RESEARCH DESCRIPTION

I study evolution, ecology, and biodiversity from a spatial and temporal perspective, integrating data from molecules (DNA), fossils, and species traits to investigate when and where groups of species originated, at what evolutionary rates, and in relation to which paleo-environmental factors. My research is centered on mammalian evolution and has focused on unique lineages of rats and mice in the tropical Americas (guinea pigs, spiny rats, and relatives) and in North American deserts (kangaroo mice and relatives). Using approaches from phylogenetics, biogeography, paleobiology, and population genetics, I aim to uncover core aspects of the evolutionary process and broadly communicate the results to inform and encourage biodiversity conservation in the tropical and arid ecosystems where I work.

ACADEMIC DEGREES

2014 Ph.D., Evolutionary Biology, University of Chicago. Bruce D. Patterson, advisor.
Thesis: *Ecological diversification and biogeography in the Neogene: Evolution of a major lineage of American and Caribbean rodents (Caviomorpha, Octodontoidea)*

2010 M.S., Evolutionary Biology, University of Chicago, Chicago, IL.

2008 M.A., Biology, Occidental College (courses at Cal Tech). John C. Hafner, advisor.
Thesis: *Rodent activity in relation to moonlight in sandy and open habitats of the Great Basin*

2006 B.A., Biology, *magna cum laude*, Occidental College, Los Angeles, CA. John C. Hafner, advisor.
Honors thesis: *Phylogeography of the dark kangaroo mouse, Microdipodops megacephalus*
Academic exchange: 2004 to University of East Anglia, Norwich, UK.

CURRENT POSITIONS

Apr 2015-. *Postdoctoral Associate,* Yale University, Department of Ecology and Evolutionary Biology: with Dr. Walter Jetz on the NSF-funded VertLife Terrestrial project investigating spatial patterns of macroevolution and conservation in tetrapods.

Aug 2014-. *Research Associate,* Field Museum of Natural History, Integrative Research Center (Mammals): with Dr. Bruce Patterson on biogeography of Neotropical mammals.

2014-2017. *Board of Directors*, American Society of Mammalogists (elected Jun 2014).

Jul 2015-. *Member*, IUCN Small Mammal Specialist Group, South America team.

PREVIOUS ACADEMIC POSITIONS

2014-2015. *Postdoctoral Fellow*, Department of Biology, McMaster University: with Drs. Ben Evans and Brian Golding on the evolutionary genomics of polyploidy in mammals.

2014 Sep-Dec. *Sessional Faculty*, Department of Biology, McMaster University: gave 36 lectures (1-hr each) and designed exams for Biodiversity, Evolution & Humanity (BIO 1M03), an introductory course of 700 students.

2008-2014. *Resident Graduate Student*, Department of Zoology, Field Museum of Natural History: collaborative researcher working in the mammal collections (220,000+ specimens), geometric morphometrics, DNA sequencing, analysis of phylogenetic and macroevolutionary patterns, and outreach to local primary school students.

2006-2008. *Curatorial Associate*, Moore Laboratory of Zoology, Occidental College: responsible for care and maintenance of 65,000+ bird and mammal specimens, specimen loans, managing curatorial employees, and operation of the molecular systematics laboratory.

2004-2006. *Summer Researcher* (stipend), Biology Department, Occidental College.
2003-2006. *Undergraduate Researcher* (course credit), Biology Department, Occidental College.

HONORS AND AWARDS

2005. **Occidental College**, Kurata Student Award for Outstanding Senior in Biology.
2006. **American Society of Mammalogists**, Undergraduate Student Research Honoraria for "Phylogeography of the dark kangaroo mouse, *Microdipodops megacephalus*".
2007-8. **Occidental College**, Graduate Student Travel Awards.
2010. **American Society of Mammalogists**, Student Travel Fellowship.
2012. **American Society of Mammalogists**, A. Brazier Howell Graduate Student Honorarium for "Diversification and biogeography of a major lineage of Neotropical rodents (Caviomorpha: Octodontoidea)".
2014. **American Society of Mammalogists**, Student Travel Fellowship.
2014. **American Society of Mammalogists**, elected to Board of Directors (three-year term).

SCHOLARSHIPS AND FELLOWSHIPS

2002. **Occidental College**, President's Scholarship, $50,000 for tuition (2002-2006).
2004. **Howard Hughes Medical Institute**, Undergrad. Summer Fellow, $200 project, $4150 stipend.
2009. **U.S. Department of Education**, Graduate Assistance in Areas of National Need (GAANN) Training Grant in Evolutionary Environmental Biology, $30,000 stipend/yr (2009-2011), P200A090336.
2012. **Field Museum of Natural History**, Lester Armour Grad. Fellow, $26,000 stipend/yr (2012-2013).

RESEARCH GRANTS

2003. **Occidental College**, Academic Student Projects Research Grant, $300 project.
2004. **Howard Hughes Medical Institute**, Undergraduate Research Grant, $500 project, $600 stipend.
2005. **Norris Foundation,** Norris Scholars Fellowship, "Molecular phylogenetics of the dark kangaroo mouse, *Microdipodops megacephalus,*" $3000 project, $8000 stipend.
2009. **Field Museum of Natural History,** Pritzker Laboratory for Molecular Systematics and Evolution, "Molecular phylogenetics of Neotropical rodents," $2000.
2010. **American Society of Mammalogists**, Grant-in-Aid of Research, "Diversification of the South American rodent superfamily Octodontoidea: enhancing temporal and phylogenetic resolution with a complete suite of genera," $1290.
2011. **University of Chicago**, Hinds Fund (Committee on Evolutionary Biology), "Time, species, and morphology: investigating the diversification of a diverse lineage of Neotropical rodents (Caviomorpha: Octodontoidea)," $1000.
2011. **National Science Foundation**, Doctoral Dissertation Improvement Grant (DDIG), "DISSERTATION RESEARCH Fossils and phylogeny: investigating the timing of diversification in a diverse lineage of Neotropical rodents (Caviomorpha: Octodontoidea)" (co-PI with Bruce Patterson as PI/PD), $15,000 (2011-2013), DEB-1110805.
2014. **Royal Ontario Museum**, Schad Conservation Grant, "Integrating ecological and economic tools for sustainable conservation: Mammals as indicators of ecosystem and societal health in the Dominican Republic" (co-author with Burton Lim as PI), $30,000 (2014-2015).

PEER-REVIEWED PUBLICATIONS (https://www.researchgate.net/profile/Nathan_Upham/publications)

2008. Hafner, J. C., **N. S. Upham**, E. Reddington, and C. W. Torres. Phylogeography of the pallid kangaroo mouse, *Microdipodops pallidus*: a sand-obligate endemic of the Great Basin, western North America. *Journal of Biogeography* **35**: 2102-2118. http://dx.doi.org/10.1111/j.1365-2699.2008.01942.x

2011. Hafner, J. C., and **N. S. Upham**. Phylogeography of the dark kangaroo mouse, *Microdipodops megacephalus*: cryptic lineages and dispersal routes in North America's Great Basin. *Journal of Biogeography* **38**: 1077-1097. http://dx.doi.org/10.1111/j.1365-2699.2010.02472.x

2012. Light, J. E., Hafner, J. C., **Upham, N. S.**, and Reddington, E. Conservation genetics of kangaroo mice, genus *Microdipodops*. *Journal of Mammalian Evolution* **20**: 129-146. http://dx.doi.org/10.1007/s10914-012-9193-2

2012. **Upham, N. S.** and B. D. Patterson. Diversification and biogeography of the Neotropical caviomorph lineage Octodontoidea (Rodentia: Hystricognathi). *Molecular Phylogenetics and Evolution* **63**: 417-429. http://dx.doi.org/10.1016/j.ympev.2012.01.020

2013. **Upham, N. S.**, and J. C. Hafner. Do nocturnal rodents in the Great Basin Desert avoid moonlight? *Journal of Mammalogy*. **94**: 59-72. http://dx.doi.org/10.1644/12-MAMM-A-076.1. Popular press article here.

2013. **Upham, N. S.**, R. Ojala-Barbour, J. Brito, P. M. Velazco and B. D. Patterson. Transitions between Andean and Amazonian centers of endemism in the radiation of some arboreal rodents. *BMC Evolutionary Biology* **13**:191. http://www.biomedcentral.com/1471-2148/13/191. Highly accessed article. Featured on my graduate program website here.

2014. Patterson, B. D. and **Upham, N. S**. A study in contrasts: two extensive Neotropical radiations. *Frontiers in Ecology and Evolution* **2**: 44. http://dx.doi.org/10.3389/fevo.2014.00044

2014. Patterson, B. D. and **Upham, N. S**. A newly recognized family of mammals from the Horn of Africa, the Heterocephalidae (Rodentia: Ctenohystrica). *Zoological Journal of the Linnean Society* **172**: 942-963. http://dx.doi.org/10.1111/zoj.12201

2015. D'Elía, G., Teta, P., **Upham, N. S.**, Patterson, B. D., and Pardiñas, U. F. J. Description of a new soft-haired mouse, genus *Abrothrix* (Sigmodontinae), from the temperate Valdivian rainforest. *Journal of Mammalogy* **96**: 839-853.

2015 (*In press*). **Upham, N. S.**, Patterson, B.D. Evolution of caviomorph rodents: a complete phylogeny and timetree for living genera. In: Vassallo, A.I., Antenucci, D. (Eds.), *Biology of caviomorph rodents: diversity and evolution*. Argentine Mammal Society, SAREM, Buenos Aires, Argentina.

NON-REFEREED PUBLICATIONS

2014. **Upham, N. S.** At the edge of what we know. *The Human Geographic* (online multi-media magazine), issue 1: http://www.thehumangeographic.com/vizcacha-rat/.

THESES

2008. **Upham, N. S.** *Rodent activity in relation to moonlight in sandy and open habitats of the Great Basin Desert*. Unpubl. M.A. thesis, Occidental College, viii + 65 pp.

2014. **Upham, N. S.** *Ecological diversification and biogeography in the Neogene: Evolution of a major lineage of American and Caribbean rodents (Caviomorpha, Octodontoidea)*. Unpubl. Ph.D. dissertation, University of Chicago, xvi + 272 pp. http://gradworks.umi.com/36/15/3615686.html. Abstract published in *Mastozoología Neotropical* **21**: 193-194.

MANUSCRIPTS IN PREPARATION

In prep. **Upham, N. S.** and Patterson, B. D. Testing for adaptive radiation and ecological constraint in a major lineage of rodents. *Evolution*.

In prep. **Upham, N. S.** and Patterson, B. D. Evolution of caviomorph rodents: toward a complete phylogeny for living species. *Ecology and Evolution*.

In prep. **Upham, N. S.**, Borroto-Páez, R., and Patterson, B. D. Conservation genetics of Caribbean hutias (Rodentia, Capromyidae). *Journal of Mammalogy* (invited, Special Feature).

PRESENTATIONS TO PROFESSIONAL MEETINGS (WITH PUBLISHED ABSTRACTS)

2005. American Society of Mammalogists, 85th Annual Meeting; Springfield, MO (oral). *Molecular phylogenetics of the dark kangaroo mouse, Microdipodops megacephalus* (with co-author J. C. Hafner)

2006. American Society of Mammalogists, 86th Annual Meeting; Amherst, MA (oral). *Phylogeography of the dark kangaroo mouse, Microdipodops megacephalus* (with co-author J. C. Hafner).

2007. American Society of Mammalogists, 87th Annual Meeting; Albuquerque, NM (oral). *Rodent activity in response to lunar illumination in sandy habitats of the Great Basin Desert* (with co-author J. C. Hafner).

2009. 10th International Mammalogical Congress; Mendoza, Argentina (poster). *Moonlight avoidance by bipedal, but not quadrupedal, rodents in sandy and open habitats of the Great Basin Desert, U.S.* (with co-author J. C. Hafner).

2010. American Society of Mammalogists, 90th Annual Meeting; Laramie, WY (oral). *Evolution of the New World rodent superfamily Octodontoidea: preliminary patterns using multiple genes and fossils* (with co-author B. D. Patterson).

2011. American Society of Mammalogists, 91st Annual Meeting; Portland, OR (poster). *A preliminary analysis of divergence timing and historical biogeography in the Neotropical caviomorph lineage Octodontoidea (Rodentia: Hystricognathi)* (with co-author B. D. Patterson).

2011. IV Congreso Latinoamericano Paleontologia de Vertebrados, San Juan, Argentina (oral). Invited participant in the symposium "Origines y Evolucion del Neotropico Sudamericano." *Molecular phylogeny, divergence timing, and biogeography of the Neotropical caviomorph lineage Octodontoidea (Rodentia: Hystricognathi)* (with co-author B. D. Patterson).

2012. American Society of Mammalogists, 92nd Annual Meeting; Reno, NV (oral). Invited participant in the opening plenary session. *Diversification of a major lineage of Neotropical rodents (Caviomorpha, Octodontoidea): insights from DNA sequences and fossil mandibles*.

2012. Society for Conservation Biology, 1st North America Congress; Oakland, CA (poster). *Biogeography and conservation of Cuba's endemic non-flying mammals* (with co-author R. Borroto-Páez).

2012. II Congreso Latinoamericano de Mastozoología; Buenos Aires, Argentina (oral). Invited participant in the symposium "Biología de los roedores Caviomorfos: diversidad y evolución" (delivered in English with Spanish slides). *Diversificación molecular y morfológica de un linaje mayor de roedores neotropicales (Caviomorpha: Octodontoidea)* (with co-author B. D. Patterson).

2013. Evolution Annual Meetings; Snowbird, UT (oral). *Andes-Amazon diversification in a diverse lineage of tropical rodents: integrating DNA sequences, fossils, and species traits* (with co-author B. D. Patterson).

2014. Genomes to Biomes, 1st Joint Conference of the Canadian Societies CSEE, CSZ, and SCL; Montreal, QC (oral). *Testing for adaptive radiation and ecological constraint in a major lineage of rodents (Caviomorpha, Ctenohystrica)* (with co-author B. Evans and B. D. Patterson).

2014. American Society of Mammalogists, 94th Annual Meeting; Oklahoma City, OK (oral). *Testing for adaptive radiation and ecological constraint in a major lineage of rodents (Caviomorpha, Ctenohystrica)* (with co-author B. D. Patterson).

2015. American Society of Mammalogists, 95th Annual Meeting; Jacksonville, FL (oral). Co-organizer of the 2-part featured symposium "The Last Remaining Caribbean Mammals: Conservation Priorities and the Historical Context of Extinctions in an Island Biodiversity Hotspot." *Endangered Cuban hutias: Population genetics and biogeography in the context of an evolutionary radiation* (with co-author R. Borroto-Páez).

INVITED LECTURES

2009. University of Chicago, Biogeography (undergraduate course taught by Bruce Patterson). *Phylogeography: the uses of phylogeny in reconstructing historical biogeography*.

2009. University of Chicago, Animal Behavior Brownbag Seminar Series. *Moonlight avoidance by bipedal, but not quadrupedal, desert rodents in sandy and open habitats of the Great Basin Desert*.
2009. University of Chicago, Mammalian Ecology (undergraduate course taught by Eric Larsen). *Phylogenetics and phylogeography: evolutionary tree construction and applications for mammal biogeography*.
2010. University of Chicago, Public and Private Lives of Insects (undergraduate course taught by Eric Larsen). *Insect-mammal coevolution: using phylogeny to find shared patterns in the tree of life.*
2010. University of Chicago, CEB / GAANN Annual Retreat. *Evolution of the New World rodent superfamily Octodontoidea: using multiple genes and fossils to understand a Miocene radiation*.
2011. University of Chicago, GeoUnion (undergraduate science club). *Rats! : Explorations in the evolution of New World rodents*.
2011. University of Chicago, CEB / GAANN Annual Retreat. *Fossils and phylogeny: Investigating diversification patterns in a diverse lineage of New World rodents (Caviomorpha: Octodontoidea)*.
2012. University of Chicago, CEB / GAANN Annual Retreat. *Diversification of a major lineage of Neotropical rodents (Caviomorpha, Octodontoidea): insights from fossil mandibles and DNA*.
2012. Pritzker Laboratory for Molecular Systematics and Evolution. *Rats from the Neotropics: insights from DNA and mandibles*.
2012. Universidade Federal do Espirítu Santo, Departamento de Ciências Biológicas, Vitória, Brasil (delivered in English with Portugese slides). *Diversificação molecular e morfológica de Neotropical roedor linhagem maior (Caviomorpha: Octodontoidea)*.
2013. University of Chicago, CEB / GAANN Annual Retreat. *Old rats from the Neotropics: using ancient DNA and fossils to study the evolutionary diversification of a major rodent lineage*.
2014. McMaster University, Evans / Golding Laboratory. *Ecological diversification and biogeography of a major clade of American and Caribbean rodents*.
2014. Instituto Argentino de Investigaciones de Zonas Aridas (IADIZA), Mendoza-CONICET (delivered in English with Spanish slides). *Pruebas para la radiación adaptativa y limitaciones ecológicas en un linaje principal de roedores*.
2014. McMaster University, Ecology, Evolution, & Behavior series. *Arid adaptation and the largest mammalian genome: investigating the ploidy, ecology, and physiology of Argentine vizcacha rats*.
2015. McMaster University, Evans / Golding Laboratory. *Genome expansion in the vizcacha rats of Argentina: Mechanisms and consequences in the largest mammalian genome.*
2015. Yale University, Jetz Laboratory. *Testing for adaptive radiation and ecological constraint in a major lineage of rodents*.

FIELDWORK EXPERIENCE

Argentina (2 trips, 1 months): Collecting octodontid rodents for a project on the genomics of mammalian tetraploidy. Provinces of Mendoza and San Juan (2014—0.5 month; 2015—0.5 month)

Costa Rica (2 trips, 1.5 months): Participant in an NSF-sponsored (Pan-American Advanced Studies Institute) graduate course through the Organization for Tropical Studies. La Selva (2009—0.5 month; 2010—0.25 month); Monteverde (2009—0.25 month); Palo Verde (2009—0.25 month); Las Cruces (2009—0.25 month)

Dominican Republic (1 trip, 0.75 months): Surveying endemic bats and small mammals (hutias, solenodon) for a project on biodiversity patterns and tourism sustainability. Provinces of La Vega, Sánchez Ramirez, Monte Plata, El Seibo, and La Altagracia (2015).

Chihuahuan and Sonoran Deserts, USA (1 trip, 1 month): Teaching assistant on the University of Chicago's Desert Ecology Field School (2011)

Great Basin Desert, USA (12 trips, 3 months): Collected rodents at ~25 localities for multiple projects. Nevada (2003—0.25 month; 2004—1 month; 2005—0.5 month; 2006—0.5 month); Oregon (2004—0.5 month); California (2005—0.25 month)

Yosemite and the eastern Sierra Nevada, USA (1 trip, 0.5 month): Teaching assistant on Occidental College's California Environment Semester (2007)

LABORATORY EXPERIENCE

2003–2007. Occidental College, Moore Laboratory of Zoology (Los Angeles, USA): Undergraduate student (8 semesters, 3 summers) and Master's student; researched the molecular systematics and phylogeography of kangaroo mice using PCR and DNA sequencing.

2010–2012. Field Museum of Natural History, Pritzker Laboratory for Molecular Systematics and Evolution (Chicago, USA): Resident Ph.D. student; researched the molecular phylogeny and diversification of caviomorph rodents using DNA from fresh and dried tissues.

2012. Royal Ontario Museum, Laboratory for Molecular Systematics (Toronto, Canada): DNA sequenced imported tissues of Caribbean rodents.

2012. Universidade Federal do Espírito Santo, Laboratório de Mastozoologia e Biogeografia (Vitória, Brazil): DNA sequenced rodent specimens from Brazil.

2012-2013. McMaster University, Ancient DNA Centre (Hamilton, Canada): Performed clean-room DNA extractions and sequencing of nDNA and mtDNA from dried tissues (museum specimens).

MUSEUM COLLECTIONS EXPERIENCE

Argentina: Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Buenos Aires—2011, 2012); Museo de Ciencias Naturales de La Plata (La Plata—2011); Museo Municipal de Ciencias Naturales "Lorenzo Scaglia" (Mar del Plata—2011); Museo Paleontologico Edigio Feruglio (Trelew—2011); Instituto Argentino de Investigaciones de Zonas Áridas (Mendoza—2015)

Brazil: Museu Zoologia de Universidade de São Paulo (São Paulo—2012); Museu Nacional (Rio de Janeiro—2012)

Canada: Royal Ontario Museum (Toronto—2012)

USA: Field Museum of Natural History (Chicago—2009-2014); Florida Museum of Natural History (Gainesville—2012); Moore Laboratory of Zoology (Los Angeles—2006-2008); University of California Museum of Vertebrate Zoology (Berkeley—2012); University of California Museum of Paleontology (Berkeley—2012)

TEACHING EXPERIENCE

2005. *Teaching assistant*, Occidental College: Evolutionary Biology (Fall semester). Graded exams and led review sessions for lecture.

2006. *Lab instructor and lecturer*, Occidental College, Summer Oceanology Program.

2007. *Lab instructor and lecturer*, Occidental College, Summer Oceanology Program.

2007. *Teaching assistant*, Occidental College: Evolutionary Biology (Fall semester). Graded exams and led review sessions for lecture.

2009. *Teaching assistant*, University of Chicago: Mammalian Ecology (Spring quarter). Led a laboratory section of 20 students in identifying mammal skull features.

2009. Teaching Assistant Training Course, taken in the Division of Biological Sciences, University of Chicago (Fall quarter). Pedagogy course on lecturing and teaching skills.

2010. *Teaching assistant*, University of Chicago: Insect Ecology & Evolution (Fall quarter). Graded exams for lecture section.

2010. *Workshop leader*, SERTS teaching program (Science and Engineering Research and Teaching Synthesis), Northwestern University (2 weeks). Led 4 students in projects related to museum science and mammal conservation.

2011. *Teaching assistant*, University of Chicago: Biogeography (Winter quarter). Led a laboratory section of 8 students.

2012. *Teaching assistant*, University of Chicago: Ecology & Evolution in the Southwest (Spring quarter). Led a discussion group of 20 students.

2014. *Sessional Faculty*, McMaster University: Biodiversity, Evolution & Humanity (BIO 1M03; Autumn semester—primary instructor for 6 weeks of co-taught course with Dr. Ben Bolker). Gave 36 hour-long lectures to an introductory course of 700 students.

MENTORING EXPERIENCE

Harah Milki (2006-2007) undergraduate, Occidental College (now 10th grade Algebra teacher, Los Angeles). Mentored on molecular phylogenetics of kangaroo mice.

Lauren Hennelly (2011) undergraduate, University of Wisconsin Madison (now field assistant, Univ. of Auckland). Mentored on rodent life-history project in the Field Museum Division of Mammals.

Molly Fisher (2012) undergraduate, Cornell University (now Ph.D. student, Univ. of Georgia). Mentored on rodent geometric morphometrics project in the Field Museum Division of Mammals.

Alexandra Weber (2012) undergraduate, Loyola University (now 4th year in B.Sc., Biology). Mentored on molecular techniques for bat phylogenetics project in the Field Museum Pritzker Laboratory.

SCIENCE OUTREACH AND COMMUNITY SERVICE

- Weekly tutoring in 8th grade geometry at Canter Middle School (Chicago—2010).
- Presented mammal specimens to young adults participating in Project Exploration's Sisters4Science program at the Field Museum of Natural History (Chicago—2010, 2011, 2012).
- Presented information on mammal biology to 8-12th graders in Project Exploration's All Girls Expedition summer course (Chicago—2011).
- Discussed science career opportunities with 7th grade science class at the Young Women's Leadership Charter School (Chicago—2012).
- Presented information on comparative vertebrate anatomy to 8-12th graders in the Project Exploration's Junior Paleontologists summer course (Chicago—2012).
- Highlighted research on a digital touch-screen at the Field Museum's DNA Discovery Center public exhibit (Chicago—2012-present)
- Participant in "Talk to the Scientist Hour" programs in the Field Museum's Pritzker Laboratory for Molecular Systematics (Chicago—2012, 2013).
- Project Exploration Program Facilitator for weekly Brothers4Science outreach program at Ariel Community Academy teaching science to 6th-8th grade boys (Chicago—2012).
- Tutor for Reading Buddies and Homework Help programs at the Hamilton Public Library (Hamilton, Canada—2013, 2014).
- Tutor in math and science at Empowerment Squared, a program for Liberian immigrants (Hamilton, Canada—2014, 2015).

TRAINING COURSES AND WORKSHOPS ATTENDED

2009. *Estimating Species Trees Workshop*, University of Michigan.

2012. *Genotype-by-sequencing workshop*, Field Museum of Natural History: one week of lectures and training in next-gen sequencing methods and analysis.

2012. *Best Practices in Species Distribution Modeling in Conservation*, University of California at Berkeley.

2012. *Orienting with GPS, Map and Compass*, University of California at Berkeley.

2015. *Wilderness First Responder*, National Outdoor Leadership School, Flagstaff, AZ: 10-day course including WFR and First-Aid certification (valid to Mar 2017).

TRAINED SKILLS

- Fieldwork – Driving manual transmission and four-wheel drive vehicles; mammal live-trapping and museum specimen preparation; orienteering with map and compass
- Bioinformatics – Proficient in bash shell scripting and the R programming language; some experience with python and relational databases (psql)

- Other software – statistical phylogenetics (e.g., BEAST, r8s, RAxML, MrBayes, PAUP, Geneious, Mesquite), ArcGIS software, MS Office suite
- Molecular genetics – Fluent in methodologies for ancient DNA and modern DNA extraction, PCR amplification, Sanger DNA sequencing
- Spanish language – Intermediate written and spoken

PROFESSIONAL SOCIETIES: MEMBERSHIPS AND SERVICE

American Society of Mammalogists, ASM (2005-present)
Board of Directors (2014-present; 3-year term)
Conservation Committee (2012-present)
Systematic Collections Committee (2011-present)
American Society of Naturalists (2013-present)
Canadian Society for Ecology and Evolution (2014-2015)
European Society for Evolutionary Biology (2013)
Sociedad Argentina para el Estudio de los Mamíferos, SAREM (2012-2014)
Sociedade Brasileira de Mastozoologia, SBMz (2012-2013)
Society for Conservation Biology, SCB (2012)
Society of Systematic Biologists, SSB (2009-2011, 2013)
American Association for the Advancement of Science, AAAS (2006-2010)

OTHER PROFESSIONAL SERVICE

Manuscript referee for *American Midland Naturalist* (2012), *BMC Evolutionary Biology* (2014 [x2]), *Ethology, Ecology & Evolution* (2014), *Journal of Biogeography* (2014), *Journal of Mammalian Evolution* (2013), *Journal of Mammalogy* (2013, 2014 [x3], 2015), *Journal of Zoology* (2012), *Molecular Phylogenetics and Evolution* (2014 [x2]), *PLoS One* (2013), and *Zootaxa* (2012, 2015)
Student speaker, *Symposium in Honor of Leigh Van Valen*, University of Chicago (2011).
Organizing committee, *Darwin / Chicago Symposium*, University of Chicago (2009).

REFERENCE CONTACTS

Bruce D. Patterson (bpatterson@fieldmuseum.org; Ph.D advisor)
MacArthur Curator of Mammals, Department of Zoology
Field Museum of Natural History
1400 S. Lake Shore Dr., Chicago IL 60605; tel. 312-665-7750

John C. Hafner (hafner@oxy.edu; M.A. advisor)
Emeritus Director, Curator of Birds and Mammals, and Professor of Biology
Moore Laboratory of Zoology and Department of Biology
Occidental College, Los Angeles, CA
Current address: 105 Franklin Avenue, Fortuna, CA 95540

Trevor D. Price (pricet@uchicago.edu; Ph.D. committee member)
Professor of Biology, Department of Ecology and Evolution
University of Chicago
1101 E. 57th St., Chicago, IL 60637; tel. 773-702-5176

David Jablonski (djablons@uchicago.edu; Ph.D. committee member)
William R. Kenan, Jr. Professor, Department of the Geophysical Sciences
University of Chicago
5734 S. Ellis Ave. HGS 213, Chicago, IL 60637; tel. 773-702-8163

Richard H. Ree (rree@fieldmuseum.org; Ph.D. committee member)

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Field Museum of Natural History
1400 S. Lake Shore Dr., Chicago IL 60605; tel. 312-665-7857